



Norfolk Southern Corporation
1200 Peachtree Street NE - Box 13
Atlanta, GA 30309
Phone: 404-582-5185
steven.aufdenkampe@nscorp.com

Steven Aufdenkampe
Engineer Environmental
Remediation

RECEIVED

May 30, 2017

JUN 01 2017

Tim Homosky
South Carolina Department of Health and Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, South Carolina 29201

SITE ASSESSMENT,
REMEDICATION &
REVITALIZATION

**RE: Removal Action Work Plan – Revision 1 Response to Comments
Norfolk Southern Wayne Street Site
1001 Wayne Street
Columbia, Richland County, South Carolina 29201
Site ID # 416941
VCC # 16-5988-RP**

Dear Mr. Homosky:

On May 25, 2017, the South Carolina Department of Health and Environmental Control (SCDHEC) issued a comment letter related to the review of the *Removal Action Work Plan-Revision 1* (AECOM, 2017) for the Wayne Street Site located at 1001 Wayne Street, Columbia, South Carolina. Please see the below response to these comments.

1. **Section 4.5.3 Soil Excavation and Stabilization:** The Work Plan states that soils will be loaded for disposal when laboratory results indicate that soil meets the TCLP regulatory limit of 5 milligrams per liter for each RCRA regulated metal required by the disposal facility, which is anticipated to be a local Subtitle D landfill. The Work Plan should be revised to state specifically that at a minimum these results will include both arsenic and lead, as well as other parameters required by the disposal facility.

The Work Plan has been revised to specifically indicate arsenic, lead, and any additional parameters required by the disposal facility will meet applicable TCLP regulatory limits prior to offsite disposal.

2. **Section 4.8 Groundwater Monitoring Program:** The Department has previously indicated the need to delineate the downgradient extent of groundwater impacted by lead above the action level. Norfolk Southern has responded that the need for further assessment will be evaluated after the monitoring well network is replaced and an additional round of monitoring has been conducted.

Section 3 of the VCC sets out the Response Actions to which NSRC agreed in executing the contract, including item C., Post Removal Site Control/Groundwater Investigation. Specifically item 3.C. ii states: *"Upon completion of the soil stabilization and removal activities, implement a groundwater assessment and monitoring program as outlined and approved in the Soil Removal Action Work Plan."* The Work Plan must be revised to include a plan for delineation of the extent of lead in groundwater above the action level of 0.015 mg/L, as well as groundwater monitoring.

The delineation of lead in groundwater downgradient of the former location of MW-11 will be required regardless of the results of the monitoring event described in the revised Work Plan. This plan for delineation will be a condition of the Department's approval of the Work Plan.

AECOM and Norfolk Southern are committed to upholding the terms of the VCC. Section 4.8 has been modified.

3. **Table 1, Project Organizational Chart: The Section Manager for the State Voluntary Cleanup Program has changed to Lucas Berresford. His direct line is (803) 898-0747.**

Table 1 has been updated to reflect this change.

4. **Appendix B Example Label for Soil and Concrete going to Emelle: Hazardous Waste labels must contain the generator name associated with the EPA generator identification number SCR000778688.**

The Hazardous Waste label has been changed as recommended.

5. **Appendix F Treatability Study: The Department previously commented in its review of the August 15, 2016 work plan that the VCC requires that the Work Plan include an evaluation of soil stabilization and excavation technologies. The current Work Plan provides a two page letter from the selected subcontractor to serve as the evaluation. That letter contains two tables providing pre-treatment and post-treatment analytical results for lead by EPA SW-846 Method 6010 (total metals), and by TCLP. The post-treatment results indicate the effectiveness of varying application rates of the proposed soil amendment on TCLP lead results. No results have been provided to demonstrate the effectiveness of this treatment method with respect to arsenic, which is also a contaminant of concern at the site. The solubility and mobility of arsenic in soils cannot be assumed based on the data presented. Treatability of arsenic using the proposed process should be evaluated prior to mobilization.**

After discussion with Severson, it was determined that arsenic results were unintentionally omitted from treatability study results. Arsenic was not a target analyte in the treatability due to relatively low concentrations compared to lead and therefore arsenic results were not included. Analysis for arsenic was conducted during the February 2016 treatability study and those results have been added to Appendix F in the Work Plan. All TCLP arsenic results at various dose rates were at or below detection limits (<0.050 mg/l), which is below the regulatory limit of 5 mg/l. As a result of this site-specific study and similar project results our evaluation indicates that the use of MAECTITE does not adversely affect the solubility or mobility of arsenic. Additionally, as indicated in Section 4.5.3 of the Work Plan we will be confirming TCLP results for every 250 yd³ of soil generated.

If you have any questions regarding this submittal, please contact me or Brandt Morrow at (704) 499-6205 or brandt.morrow@AECOM.com.

Respectfully Submitted,



Steven Aufdenkampe
Engineer Environmental Remediation

**Removal Action Work Plan – Revision 1
Norfolk Southern Railway Company
Wayne Street Site
1001 Wayne Street
Columbia, Richland County, South Carolina
SC DHEC VCC #16-5988-RP**

Submission Date: May 30, 2017

Prepared by:

AECOM Technical Services, Inc.
5925 Carnegie Boulevard, Suite 370
Charlotte, North Carolina 28209
Tel: 704-553-6150
Fax: 704-553-6151

On behalf of:

Norfolk Southern Railway Company
1200 Peachtree Street, NE - Box 13
Atlanta, Georgia 30309

Table of Contents

Professional Engineer Certification	vi
1.0 Introduction.....	1
1.1 Purpose.....	1
1.2 Site Location	1
1.3 Site Description.....	1
1.4 Summary of Previous Work.....	2
1.5 Removal Action Objectives	3
1.6 Overview of Removal Action	3
1.7 General Description of Removal Action.....	4
1.8 Permits and Notifications.....	5
2.0 Site Geology/Hydrogeology	6
2.1 Site Topography, Geology and Hydrogeology	6
2.2 Hydrogeology	6
2.3 Climate.....	7
3.0 Project Organization	8
3.1 Project Organization Chart	8
3.2 Construction Management Responsibilities	8
3.3 Quality Assurance Responsibilities	10
4.0 Removal Action Design and Procedures	11
4.1 Removal Excavation Design Basis	11
4.2 Pre-characterization Sampling.....	11
4.3 Remediation Waste Management Regulatory Planning	12
4.4 Removal Excavation Implementation.....	12
4.4.1 Site Preparation and Controls.....	12
4.4.2 Support Facilities.....	12
4.4.3 Traffic Control Plan.....	12
4.4.4 Site Security	13
4.4.5 Establish Work Zones	13
4.4.6 Utility Locate and Awareness	14
4.4.7 Site Survey	14
4.4.8 Monitoring Well Abandonment and Replacement.....	14
4.4.9 Fugitive Dust Air Monitoring.....	14
4.4.10 Environmental Protection Controls	16
4.5 Soil Removal Activities	16
4.5.1 Debris and Tree Removal.....	16
4.5.2 Building Demolition.....	16
4.5.3 Soil Excavation and Stabilization.....	16
4.5.4 Confirmation Sampling	18
4.6 Storm water Management	18

4.7	Offsite Disposal Activities.....	19
4.8	Groundwater Monitoring Program	19
4.9	Site Restoration.....	19
4.10	Demobilization.....	20
5.0	Analytical Program and Field Operations.....	21
5.1	Data Quality Objectives.....	21
5.2	Project Quality Objectives.....	22
5.3	Quality Control Samples.....	22
5.4	Measurement Performance Criteria	22
5.4.1	Precision	22
5.4.2	Accuracy.....	23
5.4.3	Representativeness	23
5.4.4	Comparability.....	24
5.4.5	Completeness.....	24
5.5	Field Operations.....	24
5.6	Recordkeeping	24
5.7	Sample Designation	26
6.0	Health and Safety	28
6.1	Site-Specific Health and Safety Plan	28
6.2	Personnel Decontamination Procedures	29
7.0	Reporting and Schedule	30
7.1	Reporting.....	30
7.2	Schedule of Activities	30
8.0	References.....	31

Tables

Table 1	Project Organizational Chart
---------	------------------------------

Figures

Figure 1	Site Location Map
Figure 2	Site Layout
Figure 3	Limits of Excavation
Figure 4	Site Preparation and Controls
Figure 5	Proposed Work Zone
Figure 6	Implementation Schedule

Appendices

Appendix A	SC DHEC Correspondence
Appendix B	Historical Soil Data
Appendix C	Waste Management Plan
Appendix D	Air Monitoring Plan
Appendix E	Tree Survey Memo
Appendix F	Treatability Study

Acronyms

AECOM	AECOM Technical Services, Inc.
AOC	Area of Contamination
As	Arsenic
BMPs	Best Management Practices
CAP	Corrective Action Plan
CFR	Code of Federal Regulations
City	City of Columbia, South Carolina
Contractor	selected removal contractor/qualified remediation contractor
CRZ	Contamination Reduction Zone
CWM	Chemical Waste Management
DHEC	Department of Health and Environmental Control
DNR	Department of Natural Resources
DOT	Department of Transportation
DQOs	data quality objectives
EPA	Environmental Protection Agency
ETI	Earth Tech, Inc.
Eurofins	Eurofins Laboratories in Lancaster, Pennsylvania
EZ	Exclusion Zone
ft bgs	feet below ground surface
HASP	Health and Safety Plan
JSA	Job Safety Analysis
mg/kg	milligrams per kilogram
mg/m ³	milligrams per cubic meter
MM&A	Marshall Miller & Associates, Inc.
MS/MSD	matrix spike/matrix spike duplicate
MW	monitoring well
NIOSH	National Institute for Occupational Safety and Health
NSRC	Norfolk Southern Railway Company
OSHA	Occupational Safety and Health Administration
Pb	Lead
PCBs	Polychlorinated Biphenyls
PE	Professional engineer
PPE	personal protective equipment
QA	Quality Assurance
QC	Quality Control
RAL	removal action levels

RAWP	Removal Action Work Plan
RBSL	Risk Based Screening Levels
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
RSL	Region IV Screening Level
S	soil or sediment
SC	South Carolina
SOPs	Standard Operating Procedures
SVOCs	Semi-Volatile Organic Compounds
SWPPP	Storm Water Pollution Prevention Plan
SZ	Support Zone
TCLP	Toxicity Characteristic Leaching Procedure
TEP	technical execution plan
TSP	Total Suspended Particulates
µg/L	micrograms per liter
US	United States
VCC	Voluntary Cleanup Contract 16-5988-RP
VOCs	Volatile Organic Compounds
XRF	x-ray fluorescence
yd ³	cubic yards

Professional Engineer Certification

This document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

By: _____

Jon Kucera, PE
Registered Professional Engineer
South Carolina PE No.: 24110

Date: May 30, 2017



1.0 Introduction

AECOM Technical Services, Inc. (AECOM) has prepared this Removal Action Work Plan (RAWP) for Norfolk Southern Railway Company (NSRC) to implement in-situ stabilization and offsite disposal as non-hazardous waste at the Wayne Street Site located at 1001 Wayne Street, Columbia, South Carolina (Site). This RAWP includes soil removal actions originally outlined in the approved 2002 Corrective Action Plan (CAP) prepared by Marshal Miller & Associates, Inc. (MM&A). The RAWP is pursuant to the CAP, as well as modifications outlined in the fully executed Brownfields/Voluntary Cleanup Contract 16-5988-RP (VCC) between NSRC and the South Carolina Department of Health and Environmental Control (SCDHEC), effective June 2, 2016 (**Appendix A**).

1.1 Purpose

The purpose of the RAWP is to outline the general processes and procedures necessary to remove the surface and subsurface soil at the Site that contains lead and arsenic at concentrations above the removal action levels (RALs) outlined in **Section 1.5**. This RAWP provides historical and current data that supports these determinations and institutes controls that identify project responsibilities, manages safety, and limits migration of Site contaminants, in compliance with the project schedule. The objective of the removal action is to remove impacted soil in manner that is consistent with the fully executed VCC.

1.2 Site Location

The Site consists of one triangular-shaped parcel (tax map serial number R08916-11-04A) of land totaling approximately 3.01 acres located at 1001 Wayne Street in Columbia, South Carolina. The Site coordinates are: 33° 59' 48.5" north latitude; and 81° 02' 24.2" west longitude. A topographic map displaying the Site location is presented as **Figure 1**.

1.3 Site Description

The Site currently exists as a vacant lot with limited structural improvements. One 20' x 35' building of unknown historical use is located in the northeast section of the Site. In the southwest section of the Site, a 50' x 100' concrete pad also remains intact. In addition, miscellaneous debris, consisting mainly of glass and plastic fragments and small metal pieces, is visible across the surface of much of the Site. The remainder of the Site is unimproved with some areas barren of vegetation, while other areas are covered with grassy vegetation, small shrubs and/or relatively dense tree growth. A Site layout map is presented in **Figure 2**.

The Site has been previously leased to various parties. Site historical uses are not entirely known; however, rail spurs previously existed onsite connecting the Site to the main rail line approximately 20 feet below road level on the west side of Wayne Street. Review of historical aerial photographs depicted evidence of metal debris suggesting the Site served as an automobile salvage yard briefly during the 1950s and 1960s. In addition, a 1927 tax

map indicated occupation by Palmetto Fertilizer Company and included several small buildings, as well as an acid phosphate pit.

The Site is bounded by a multi-use property on the north and east, located at 700 Gervais Street; Pendleton Street to the south, beyond which are University of South Carolina service buildings for consolidated services, safety services, and vehicle management; and Wayne Street to the west, beyond which is steeply sloping natural area leading to the main NSRC rail line. According to Richland County Geographic Information System webpage (<http://www.richlandmaps.com/apps/dataviewer/>), all of the properties adjacent to the Site are either zoned M-1 (light industrial) or M-2 (heavy industrial). Summary of Previous Work

Several subsurface investigations have been completed at the Site to evaluate the source(s) of soil and groundwater impacts. The results of these activities have been documented in submittals made to SC DHEC. Historical reports and activities for the Site are summarized below.

In April 1998, surface soils at the Site were collected using an unbiased grid layout and analyzed for the Resource Conservation and Recovery Act (RCRA) metals, including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Each of the fifteen composite soil samples consisted of four sub-samples collected within the top 1 foot of Site soils. In July 1998, two additional composite soil samples were collected at a depth of 1-2 feet below ground surface (ft bgs) to further delineate the soil contamination. As reported by Earth Tech, Inc. (ETI), now AECOM, in *Continued Hydrogeologic Assessment*, lead was found above the Environmental Protection Agency (EPA) Region IV Screening Level – Residential (RSL) of 400 milligrams per kilogram (mg/kg) in fifteen of the seventeen samples collected. The lead concentrations ranged from 219 mg/kg to 25,440 mg/kg while arsenic concentrations were detected up to 130 mg/kg. Other RCRA metals analyzed fell below their respective residential RSLs (ETI, 1999).

On August 19, 1998, SC DHEC requested the installation of groundwater monitoring wells to further investigate the extent of lead contamination throughout the Site. Four Type II groundwater monitoring wells (MW-10 through MW-13) were installed in December 1998 by ETI. During the installation, soil samples were collected in 5ft intervals from each of the boring locations. Results from the subsurface soil sampling indicated that concentrations from each of the boring locations were below the residential RSL and concluded that lead concentrations decreased with depth. Also included in the subsurface investigation, the initial groundwater assessment was completed in January 1999 by ETI (ETI, 1999). Lead concentrations were detected below South Carolina Risk-based Screening Levels (SC RBSL) ranging from 6 micrograms per liter (µg/L) to 10 µg/L in monitoring wells MW-10, MW-11, and MW-13. However, the lead concentration (2,740 µg/L) detected in the sample collected from monitoring well MW-11 was in exceedance of the SC RBSL of 15 µg/L.

In April 2001, SC DHEC requested that annual groundwater monitoring be conducted to further delineate the extent of lead contamination across the Site. Analytical results from monitoring events were submitted by ETI, MM&A, and/or Cardno MM&A in annual

reports to SC DHEC from 2001 to 2014. The following summarizes the findings of annual groundwater monitoring at the Wayne Street Site:

- Groundwater flow direction, as determined by Site monitoring well gauging performed during each annual event prior to the purging of any monitoring well for sampling purposes, has consistently been inferred to be to the southwest.
- The total and dissolved lead contaminant plume(s) appears to be confined to the Site. Concentrations of lead detected in groundwater samples collected from monitoring well MW-11 have consistently exceed the SC RBSL of 15 µg/L. Lead concentrations observed in upgradient monitoring well MW-10 and downgradient monitoring wells MW-12 and MW-13 have remained below the SC RBSL since 2012 and appear to fluctuate with seasonal changes in groundwater elevation. Based on the groundwater data generated to date, the total and dissolved lead contaminant plume(s) appears to be relatively stable.

MM&A proposed a CAP upon correspondence with SC DHEC in 2002. The activities to be performed as part of the CAP included: developing the Site into an asphalt parking lot; removing a minimum of 1 ft of soil during parking lot construction; removing soil down to 3 ft in the area surrounding the highest concentration of lead during the soil investigation performed in 1998; onsite stabilization of excavated soil before disposal; performing additional sampling in areas not covered by the proposed parking lot; continuing groundwater monitoring and assessment; and evaluating remedial alternatives for groundwater if determined necessary by SC DHEC. Historical soil analytical data is provided in **Appendix B**.

On October 30, 2014, a letter was mailed from SC DHEC inviting NSRC to enter the Site into the South Carolina Voluntary Cleanup Program VCP. The VCC contract was fully executed on June 2, 2016 and is provided in **Appendix A**.

1.4 Removal Action Objectives

The technical approach for the proposed soil excavation was developed for removal of soils in exceedance of the RALs for lead and arsenic as outlined in the VCC.

Consideration for the zoning and future use of the property, potential exposure by direct contact to public health, public welfare or the environment were determining factors for establishing the limits of excavation. The RAL for lead will be equivalent to the industrial RSL of 800 mg/kg which was developed by the Department of Energy's Oak Ridge National Laboratory (ORNL) under an Interagency Agreement as a merger of the EPA Region 3 RBC Table, Region 6 HHMSSL Table, and the Region 9 PRG Table. The RAL for arsenic will conform to the value established in the VCC of 30 mg/kg.

1.5 Overview of Removal Action

Historical soil sampling results indicate soil concentrations of lead and arsenic are above levels suitable for industrial use. **Figure 3**, generated from the historical soil data tabulated in **Appendix B**, estimates the horizontal and vertical extent of the proposed excavation. Pursuant to the CAP the entire Site will be excavated to a depth of 1 ft bgs. However, excavation past 1 ft bgs may be necessary to satisfy terms and conditions outlined in the VCC. Excavation termination depth will ultimately be determined by x-

ray fluorescence (XRF) data and corroborating confirmatory laboratory analysis indicating residual soil impacts no longer exceed the RALs for lead and arsenic. Removal action at the Site will include the following:

- Designation of an Area of Contamination (AOC), including all of the areas for excavation, to allow consolidation of soil and debris for stabilization and loading;
- Excavation of impacted soil cells as estimated on **Figure 3**;
- Prior to offsite disposal, soil will satisfy leachability requirements for a non-hazardous waste determination. If necessary, soil will be stabilized with MAECTITE® at a specific dosage rate based on the soil data and the treatability study conducted by Severson Environmental Services, Inc. on February 11, 2016 to satisfy this requirement;
- Excavation, stockpiling, loading, and transportation of soil will be completed using conventional construction equipment;
- Soil that is characterized as non-hazardous will be transported to a permitted Subtitle D landfill for disposal. Soil that fails the Toxicity Characteristic Leaching Procedure (TCLP) may be stabilized onsite until results indicate that the soils pass TCLP and it can be disposed in the Subtitle D landfill. It is anticipated that some impacted soil contain lead at high enough concentrations to deem stabilization with an amendment less cost effective than removing and disposing directly as hazardous waste. Therefore, some soil may be removed from these areas and disposed of at the Chemical Waste Management (CWM) permitted Subtitle C landfill located in Emelle, Alabama;
- Once the determination has been made that soil from a cell has been remediated to levels outlined in **Section 1.5**, certified “clean” soil will be backfilled, compacted, and the cell graded to original elevation.

1.6 General Description of Removal Action

The excavation limits have been estimated based on previous assessments and the surveyed property boundary (**Figure 3**). The general approach to implement removal action is summarized below:

- Mobilization;
- Kickoff meeting;
- Installing Site controls;
- Clearing and grubbing (including tree removal);
- Survey excavation extents and conduct subsurface utility locate;
- Excavation activities, soil stabilization, waste characterization, and disposal;
- Confirmatory sampling using XRF field measurements and/or laboratory analysis corroboration;
- Backfill, grading, and Site restoration;

- Well installation and subsequent groundwater monitoring;
- Demobilization;
- Removal Action Report.

1.7 Permits and Notifications

The appropriate state and local agencies will be contacted in order to obtain appropriate permits or approval for specific controls (i.e. soil and erosion control) as necessary prior to initiation of the work. Permits that are anticipated to be necessary prior to initiation of the soil removal activities include but are not limited to: a land disturbance permit, electrical permit, and a City of Columbia encroachment permit.

2.0 Site Geology/Hydrogeology

A detailed account of the environmental setting and historical assessments are provided in **Sections 1.2-1.4**. Presented below is a brief summary of regional and site specific geologic conditions relative to this RAWP.

2.1 Site Topography, Geology and Hydrogeology

The Site lies in western Richland County in downtown Columbia, South Carolina. The City of Columbia (City) is located near the Fall Line, a sinuous, erosionally-defined boundary that separates exposed metamorphic and igneous rocks of the Piedmont Province to the northwest from younger Coastal Plain Sediments to the southeast. The eastern Piedmont in South Carolina contains stratified sequences of metasedimentary and metavolcanic rock of Precambrian and early Paleozoic age. These sequences are intruded by Paleozoic igneous, meta-igneous, and Mesozoic igneous rocks. The Coastal Plain sediments of South Carolina consist of a seaward-thickening wedge of post-Triassic, primarily unconsolidated, siliciclastic sediments, and carbonate rocks that extend to the continental shelf break. In general, the regional topography can be described as the broad sweeping floodplains of the Congaree River dissecting gentle and widely spaced sand hills. Geologically, the widely spaced sand hills represent the upper erosional remnants of upper Cretaceous age sand and clay deposits. These Cretaceous basal deposits overlie Carolina Slate Belt metamorphic and Columbia Granite plutonic rocks. Therefore, Cretaceous age sand and clay deposits are often present as only thin veneers overlying the crystalline basement. Recent age alluvial deposits are present in low lying areas adjacent to streams and rivers (Maher, et.al., 1991).

Soil at the Site can be described as mostly micaceous, kaolinitic sands, with lenses of clay of variable thickness. Sands are mostly coarse sand to granule size, angular to subangular and poorly sorted, but some fine grained, fairly well sorted sand does occur. These sediments represent fluvial or upper delta plain environments (SC DNR, 2016). The vadose zone at the Site varies in thickness from 12 to 27 feet. Bedrock was not encountered in any borings to a depth of 37 ft bgs at the Site.

The topography of the region is in an intermediate stage of erosion, which is evident by flat interfluvial divides, narrow river valleys, and sandy hills, creating local areas of relatively high altitude and relief. The ground elevation at the Site ranges from 203 to 220 feet above mean sea level, and slopes gently from the northeast to the southwest.

2.2 Hydrogeology

Groundwater is encountered in the interstices of the weathered residuum of the crystalline rock referred to as saprolite and in the remnant sand and clay Cretaceous age deposits. Deeper groundwater is encountered in fractures and joints of the granitic bedrock in this region. Joints and fractures in the bedrock, when present, can supply groundwater suitable for drinking. However, most wells drilled in the Piedmont only supply water in sufficient quantities for private residences. Water wells drilled into saprolite seldom produce water suitable for drinking. Saprolitic groundwater is often turbid, high in iron content, and of insufficient volume to be reliable for sustained yields during droughts.

Potentiometric surface maps of historical groundwater elevation measurements indicate that groundwater flow is to the southwest beneath the Site (ETI, 2014).

The Site lies within the Rocky Branch watershed which is part of the Congaree River watershed. The Congaree River is located approximately 0.5 miles southwest of the Site. No water supply wells are located within 1 mile of the Site.

Currently, four Type II shallow monitoring wells (MW-10 through MW-13) are present at the Site. A general layout of Site is presented as **Figure 2**.

The uppermost aquifer at the Site consists of disturbed or residual soils that consist of sandy clays to clayey sands which overlie saprolitic material encountered at depths ranging from 10 to 22 ft bgs. Regionally, the upper Coastal Plain sediments form the hydrogeologic unit known as the Sandhills aquifers. The Sandhills aquifers consist of the Middendorf aquifer, the Tertiary Sand aquifer, and the Black Creek aquifer. The name of the aquifer varies dependent on geographic location. For the Site, the Middendorf aquifer is present. The Sandhills aquifers are shallow surficial aquifers, and groundwater is under water table conditions. The sediments are comprised of fine to coarse quartz and arkosic sands, with discontinuous interbeds of sandy clays, kaolins, and gravel (USGS, 1996).

2.3 Climate

Warm temperatures and abundant, well distributed rainfall throughout the year characterize Columbia, South Carolina. The average annual temperatures for Columbia area are a high of 75.3 degrees Fahrenheit (°F) and a low of 52.3 °F. On average, there are 217 sunny days per year in Columbia. On average, there are 102 days and/or approximately 45 inches of precipitation per year (<http://www.usclimatedata.com/>).

3.0 Project Organization

3.1 Project Organization Chart

A selected Contractor will be the performing authority for the majority of the removal construction tasks. The proposed project team responsible for overseeing and implementing the Site RAWP is presented graphically on **Table 1**. Roles and responsibilities are subject to change based on staff availability.

3.2 Construction Management Responsibilities

Presented below are the key personnel and respective project responsibilities.

AECOM Project Manager, Brandt Morrow, Professional Geologist

The AECOM Project Manager will be responsible for confirming that removal activities are implemented and completed in accordance with the approved RAWP and federal, state, and local regulations. He will be responsible for the following tasks:

- Monitor to document that the remediation work is completed in accordance with this RAWP;
- Monitor subcontractor compliance with the terms and conditions of their contract and verify quantities for payment purposes;
- Track project progress and schedule, and keep SCDHEC apprised of potential issues. Provide progress reports to SCDHEC during the project per the VCC;
- Monitor that AECOM personnel and subcontractors perform their designated duties in accordance with the Health and Safety Plan (HASP);
- Monitor that required quality assurance/quality control (QA/QC) procedures are properly implemented and documented and that Standard Operating Procedures (SOPs) are followed;
- Responsible for health and safety training, tracking, medical surveillance, and safety observation/near miss/incident reports; and
- Meeting the established project schedule and budget.

These objectives will be accomplished by monitoring the work progress, reviewing and planning each project task with experienced technical staff and field personnel, and make certain that appropriate and sufficient resources are available to the Site Supervisor and the team.

AECOM Principal Engineer, Jon Kucera, PE

The Principal Engineer will provide technical support to the AECOM Project Manager in areas of construction, regulatory issues, storm water management, solid and hazardous waste management, and any other technical design requirements associated with the removal action.

He will confirm that the Contractor is adhering to the design plans and following items and terms outlined in the bid document and their approved technical execution plan. He

will provide support to the AECOM Project Manager in making certain that the Site activities are implemented and completed in accordance with the SC DHEC approved RAWP and VCC as well as applicable federal, state, and local regulations.

AECOM Site Supervisor, Gregg Donahue

The Site Supervisor will have the authority to correct and implement additional measures to assure compliance with the approved RAWP. The Site Supervisor will also be responsible for general health and safety issues at the Site. Specific responsibilities will include:

- Manage and provide oversight of the Contractor and subcontractors, personnel, and equipment for removal activities on a day-to-day basis. Has the overall responsibility of documenting all Site activities
- Document and verify that AECOM personnel, subcontractors, and vendors perform their duties in accordance with the HASP.
- Confirm required QA/QC procedures are properly implemented and documented.
- Confirm the excavation work is consistent with the approved RAWP and schedule.
- Promptly notify the AECOM Project Manager in the event that unforeseen field conditions and/or problems are encountered.
- Track mileage and hours for onsite personnel. Track loads of the chosen amendment, gravel, fill, miscellaneous debris, and contaminated soil. Track heavy equipment, inspections, and maintenance. Maintain fully executed manifests. Providing a summary report to the AECOM Project Manager.
- Interface with the AECOM Project Manager about onsite implementation of the HASP.
- Direct personnel to change a work practice if it is determined to be hazardous to the health and safety of Site personnel.

AECOM Field Technician

Field Technician Site specific responsibilities will include:

- Monitor and enforce air monitoring requirements.
- Perform XRF soil analysis and conduct confirmatory and stockpile sampling.
- Assist in day-to-day field activities.
- Assist with field tracking requirements.
- Assist with health and safety meetings, job safety analysis (JSAs), enter and report safety observations/near misses/incidents.
- Maintain health and safety equipment onsite.
- All Site workers have the responsibility to stop work if an unsafe activity/situation is observed.

Selected Removal Contractor, Severson Environmental Services, Inc.

AECOM will manage the project on behalf of NSRC as the owner's representative and engineer. The scope of work will be performed under a single prime contract between NSRC and a qualified remediation contractor, Severson Environmental Services, Inc. (Severson) (Contractor).

AECOM selected Severson based on their demonstrated experience in implementation of similar remediation projects, technology selection in accordance with this RAWP, and the VCC. Severson was selected as the Contractor on March 31, 2017 to implement the removal action and will perform the following duties:

- Site preparation activities;
- Tree removal;
- Soil and erosion control measures;
- Concrete and building demolition and disposal;
- Soil stabilization, excavation, loading, disposal, and backfilling;
- Equipment decontamination; and
- Final grading and site restoration.

3.3 Quality Assurance Responsibilities

AECOM Quality Assurance/Quality Control Manager

The QA/QC Manager will be responsible for setting up the QA Program for this project and confirm that approved QA/QC procedures for this project are being followed. The QA/QC Manager will have the authority to correct and implement additional measures to assure compliance with the approved RAWP. Specific responsibilities will include:

- Make sure that data quality objectives are met;
- Document any deviations from the SOPs, with a justification for the deviations, and if necessary, initiate appropriate notification in accordance with the approved RAWP;
- Interface with the AECOM Project Manager so that the sample collection and testing are coordinated with the general progression of the work;
- Review analytical and testing results for correctness and report the data to the AECOM Project Manager;
- Coordinate with the subcontracted laboratories and verify that established analytical standard methods are being followed.

4.0 Removal Action Design and Procedures

The purpose of the soil excavation is to remove soils exceeding the RALs as described in **Section 1.5**. Excavated soils will be amended and directly loaded into trucks for offsite disposal at an appropriate facility. Stockpiling is not anticipated. The following sections discuss the excavation design basis and describe the procedures proposed to complete the excavation and restore the Site.

4.1 Removal Excavation Design Basis

The proposed excavation is based on exceedances of the lead RAL (**800 mg/kg**) and the arsenic RAL (**30 mg/kg**) in soil samples collected at the Site. The horizontal extent of the excavation will be from property boundary to property boundary. The vertical extent of the excavation will be determined by confirmation sampling to meet the RALs. However, if groundwater is encountered, the excavation depth will be terminated.

Prior to final design but subsequent to the initial submittal of this RAWP, additional lead and arsenic data was collected to supplement historical information for evaluation of an estimated removal volume, as discussed in more detail in **Section 4.2**. Historical laboratory analytical results for soil samples are presented in **Appendix B**. Based on this information, initial excavation termination depths are estimated as presented on **Figure 3**. The proposed excavation limits were designed largely by dividing the Site into 50-ft by 50-ft cells based on the previous sampling grid. The proposed excavation dimensions and depths were further extrapolated based on the following design criteria:

- The minimal excavation depth for the Site is 1 ft bgs and, based on historical XRF and laboratory analytical data, excavation depths are anticipated to extend to as deep as 6 ft bgs in limited areas. However, actual excavation depths will be based on confirmation sampling as discussed in **Section 4.5.4**. Additional soil may be excavated adjacent to deeper excavation grids to maintain excavation sidewall stability via benching, sloping, or shoring.
- One concrete pad is proposed for removal. Upon removal, soil beneath the pad will be evaluated to determine the need for additional soil excavation.
- One brick building is proposed for demolition and removal. Upon removal of the vacant building, soil beneath the building footprint will be evaluated to determine the need for additional soil excavation.

4.2 Pre-characterization Sampling

Pre-characterization soil sampling was performed from October 12-14, 2016 to provide additional lead and arsenic data across the Site. AECOM observed the installation of 21 soil borings at the Site to support soil removal excavation limits. This data in conjunction with historical soil data was utilized to better define the vertical limits of the proposed soil excavation activities. Previous investigations conducted at the Site established a 50 x 50 foot grid to provide a systematic approach to sample collection and to adequately cover the area potentially affected by historical Site activities. However, concentrations of lead and arsenic at depth are less defined across the Site.

4.3 Remediation Waste Management Regulatory Planning

Due to the potential for excavated soil to exceed the hazard characteristic for lead this Site is registered as a RCRA Large Quantity Generator (LQG). However, since this project will be implemented under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, a Remedial Action Plan pursuant to South Carolina Code R.61-79.270 Subpart H for handling potentially hazardous media is not required. Nevertheless, this RAWP is intended to document remediation waste management procedures consistent with the technical intent of South Carolina Code R.61-79.270 Subpart H for SC DHEC approval. Specifically, the plan is intended to: (1) identify the facility and remediation wastes that the RAWP will cover; (2) describe the treatment, storage, and disposal practices that the RAWP will cover including establishment of an AOC; and, (3) include information demonstrating that facility operations will comply with applicable RCRA requirements.

The remediation wastes covered by this RAWP are described in detail in **Section 4.7** and **Appendix C**. Treatment, storage, and disposal practices that the RAWP will cover are described in **Section 4.5**. The detailed descriptions of procedures included in **Section 4.5** are intended to demonstrate that the proposed soil excavation activities will comply with applicable RCRA requirements.

4.4 Removal Excavation Implementation

4.4.1 Site Preparation and Controls

The appropriate personnel and equipment will be mobilized to perform the scope of work within the estimated scheduled time frame presented in **Section 7**. Activities to be performed for preparation and control activities to be implemented prior to and during excavation and soil removal activities are described in the following sections. Health and safety procedures, including safety plan requirements, dust control, and personal protection equipment (PPE), are discussed in the HASP, which will be submitted under a separate cover.

4.4.2 Support Facilities

An office trailer may be rented, delivered, and powered to facilitate necessary systems for project execution. Project plans, drawings, supporting documentation, and SC labor law information will be located in the Site office trailer. The Site trailer may contain a storage area for equipment and supplies. Portable sanitary facilities may be established. A dumpster will be rented and stored onsite for the collection of general Site refuse. Personnel and equipment decontamination areas will be constructed and identified in accordance with HASP requirements. The proposed site preparation and controls are depicted on the attached **Figure 4**.

4.4.3 Traffic Control Plan

This plan documents the preferred routes of entry and exit to the Site, and traffic pattern onsite for vehicles hauling or handling excavated or backfill material. This plan also outlines preferred parking for non-construction vehicles. The travel routes for transfer

trucks on public right-of-way, either when delivering backfill material or removing impacted soil from the Site, will be provided by Severson within their technical execution plan (TEP).

4.4.4 Site Security

AECOM personnel will control work zone access during normal working hours. Currently, a 6-ft chain link fence fully encapsulates the Site and modifications may be made to add privacy screening. Proper signage and notices will be placed on the Site fence. All visitors, workers, and subcontractors will be required to sign a daily log maintained by AECOM personnel in the Site office trailer. The log will include date, name of visitor, company, and arrival and departure times. All Site visitors will be required to review the Site HASP and wear the appropriate PPE before entering work areas. The presence of unauthorized personnel will be reported immediately to the Site Supervisor, and the appropriate actions will be taken as directed. The Site office and entrance gates will be locked when AECOM and Contractor personnel are not onsite. Work will be performed during normal work hours and will comply with local noise ordinances.

4.4.5 Establish Work Zones

As shown on **Figure 5**, the excavation areas will be divided into a minimum of three separate work zones; the Exclusion Zone (EZ) (for actual excavation work), Contamination Reduction Zone (CRZ) (for decontamination activities), and a Support Zone (SZ) (for administration and equipment storage).

The EZ will encompass areas where personnel may be exposed to dangers of heavy equipment use or impacted media. The EZ will be clearly marked and protected from unauthorized entry. No one will enter the EZ without appropriate PPE and safety training. The size of the EZ may be adjusted as work in an area is completed and as dictated by field monitoring. Open excavations will be guarded to protect onsite workers from trip and fall hazards.

The CRZ will transition from the EZ to the SZ and will house the personnel decontamination area equipped with first aid kit, a spill kit, clean PPE, and containers for spent PPE. It is anticipated that the area just outside the Site office and just inside the construction entrances will be designated as the CRZ. All vehicles and equipment will be inspected prior to leaving the Site. Decontamination processes will be performed in such a manner as to avoid contaminating personnel, other vehicle parts, or surroundings. Vehicle decontamination techniques include but are not limited to brushing, spraying, and pressure washing. Personnel decontamination techniques will include but are not limited to disposable booties, boot scrub devices, and doffing impacted PPE. Emergency eye wash and hand washing stations will be available.

The SZ will consist of an area for personnel to conduct activities outside work areas. The temporary office will be a part of the SZ to serve as a communication center for emergency situations and provide a controlled environment for communications, administrative operations, and a point of contact location.

4.4.6 Utility Locate and Awareness

Prior to intrusive work, the Contractor will notify SC 811 and request that local utility services conduct an investigation to determine the location and orientation of underground utilities. In addition, a private utility locating company will locate underground utilities in the excavation area. Existing underground and overhead utilities that prevent removal activities will be either relocated, or removed if no longer in service. Caution and awareness of utilities that remain in place will be emphasized in Site safety meetings.

4.4.7 Site Survey

Prior to removal activities, SC professional surveyors will survey underground utility locations at the Site for permanent reference. The surveyors will create a topographic map of the Site pursuant to details outlined in the land disturbance permit and for purposes of future Site restoration. The surveyors will also establish a 50 ft by 50 ft grid covering the entire Site to demarcate estimated excavation cells as shown in **Figure 3**. Surveying will be conducted as necessary as removal work is performed as initially established. The property boundary, according to the legal description of the property, will be physically marked and excavations will be limited to these boundaries.

4.4.8 Monitoring Well Abandonment and Replacement

In anticipation of removal activities, the four onsite monitoring wells were properly abandoned in accordance with the SC Well Standards and Regulations (R. 61-71) by a SC certified well driller on November 14, 2016. The monitoring wells will be replaced with similarly screened wells to be installed by a driller licensed in SC. Following installation, the locations and elevations of the new wells will be surveyed by a professional surveyor licensed in SC. Well abandonment records were provided as an appendix in the *Groundwater Monitoring Report and Well Abandonment – November 2016*, dated February 3, 2017. Monitoring well abandonment approval was granted by SCDHEC in letter dated, July 11, 2016 (**Appendix A**).

4.4.9 Fugitive Dust Air Monitoring

Prior to beginning work, AECOM will establish an ambient air monitoring network around the Site to monitor potential fugitive dust concentrations of arsenic, lead, and total suspended particulates (TSP). The air monitoring network consists of two monitoring stations located in close proximity to the remediation boundaries. These air monitoring stations will remain operational throughout the work associated with this RAWP. The objectives of the ambient air monitoring are to:

- Document the ambient concentrations of TSP, arsenic, and lead prior to and during the remediation;
- Evaluate the contribution of the Site to local air quality;
- Provide timely feedback to the Site Supervisor concerning ambient dust levels for implementation of dust control measures.

As mentioned above, AECOM will install a two-station network of air monitoring stations near the perimeter of the construction activities. Each station contains a high-volume TSP sampler in which sample air is drawn through the sampler filter, and the mass of particulate matter collected is determined gravimetrically at an offsite laboratory. At each location, respirable particulate matter will be collected over an approximately 8-hour period each day that remediation operations are underway using these high-volume filter samplers.

The air monitoring will consist of two major elements:

1. Real-time monitoring results to provide input to the Site Supervisor. This monitoring will provide information about the general levels of air emissions and the effectiveness of emission controls. In general, if dust emissions are kept under control, the potential pollutants associated with dust, such as lead and arsenic, also will be kept under control.
2. Monitoring with offsite laboratory analysis to document potential offsite exposures. This provides data for specific pollutants (e.g., lead and arsenic) at the very low concentrations that are of interest when evaluating potential human health impacts. Note that this type of monitoring serves to document, not control, air concentrations.

The data generated both onsite and offsite will be reviewed to determine if the goals of the program are being met. The real-time (onsite) monitoring data will be used in conjunction with an emission control program to help maintain perimeter concentrations at acceptable levels. The data will be evaluated on a net ground level basis. That is, the upwind concentration will be subtracted from the downwind concentration to determine the contribution of the Site to local air quality.

In addition, breathing zone air samples may be collected and analyzed for arsenic, lead, and total dust during initial soil-disturbing activities and during tasks with the highest potential for exposure. Dust suppression methods will be used to control lead, arsenic, and nuisance dust, with the goal of dust suppression being the avoidance of exposure and elimination of any visible dust. A fire hydrant permit may be obtained from the City in order to have access to water onsite.

Area monitoring will consist of up to two direct-reading portable dust monitors strategically placed on workers and within the EZ and CRZ. Each zone will have one particulate aerosol monitors. TSI Dusttrak or Thermo Personal DataRAM monitors are examples of the types of field particulate aerosol monitors that will be used. These direct-reading portable dust monitors will be utilized for real-time assessment of dust levels during excavation. Dust levels will be checked hourly during excavation work, and the maximum instantaneous and daily average concentrations recorded in the sampling log.

An action level of 1.0 mg of particulate per cubic meter (mg/m^3) of air has been established. An engineering action level of 0.25 mg/m^3 has also been established. If monitoring equipment readings exceed 0.25 mg/m^3 , dust suppression such as watering of the excavation area will be implemented. The air monitoring plan is included as **Appendix D**.

4.4.10 Environmental Protection Controls

Environmental protection controls will include erosion and storm water controls. These controls will be in place prior to initiating land disturbance activities in accordance with an approved land disturbance permit and associated Storm Water Pollution Prevention Plan (SWPPP). Best management practices (BMPs) will be implemented at the Site to control, minimize, and/or prevent the release of impacted tailings entrained in storm water discharges. The BMPs will consist of flow diversion and sediment barriers (e.g. silt fencing, berms) as shown on **Figure 4**. Supplemental surface water control devices will be used, if necessary, as required by procedures set forth in the SC DHEC Storm Water Handbook (SC DHEC, 2005).

Two fortified construction entrances as well as an onsite haul road will be engineered to limit the amount of soil tracked onto Wayne Street (**Figures 4 and 5**).

4.5 Soil Removal Activities

Prior to removal activities, NSRC will distribute a “Construction Activity Notice” intended to be an informational flyer about Site work. Presented below is a summary of the planned removal activities. The following sections describe the excavation procedures and management of the wastes. The estimated excavation plan is presented on **Figure 3**.

4.5.1 Debris and Tree Removal

The Site contains some natural areas which in preparation for excavation will require trees and brush above the ground surface to be removed as to not disturb the surrounding soil. No trees have been classified as a “grand tree” by the City per the tree survey memo in **Appendix E**. Tree-stumps located within the proposed excavation area will be ground in place for subsequent excavation along with the surrounding soil. Grinding will be performed to limit loading/hauling issues associated with stump/roots. In addition, there are concrete, bricks, and rail tie materials onsite which will also be removed prior to or during excavation activities. These materials will be reduced in size and incorporated with the soil for offsite disposal.

4.5.2 Building Demolition

As shown on **Figure 3**, a small brick building is proposed for demolition and removal. The building will be demolished by the Contractor in accordance with local regulations and designated landfill requirements.

4.5.3 Soil Excavation and Stabilization

Previous assessment data indicate soil onsite contains lead and arsenic at concentrations exceeding acceptable levels for disposal at a Subtitle D landfill. Therefore, soil will be stabilized to render the lead and/or arsenic as present as non-leachable such that the material can be disposed offsite in a non-hazardous waste landfill.

Sevenson was selected as the removal contractor for the Site. Sevenson will adhere to the SCDHEC approved RAWP and the VCC.

Based on the results of a treatability study conducted in February 2016 provided as **Appendix F**, Severson intends to use MAECTITE® to chemically fixate soils in-situ that exceed TCLP limits for non-hazardous disposal.

No other reagents will be used (excluding water) during the fixation process. Appropriate dosing rates (between 0.5% and 7%) will be calculated based on initial TCLP soil analytical results for each grid. The MAECTITE® will be thoroughly mixed into the soil using a backhoe with a standard bucket attachment. No curing time is needed once the mixing process is complete meaning confirmatory TCLP soil samples can be collected immediately thereafter.

TCLP samples will be collected at a minimum of approximately every 250 cubic yards (yd³) of soil generated after stabilization has taken place. Five aliquots will be collected if soil is to be directly loaded or if the stabilized soil is to be stockpiled with spatial considerations. Sampling personnel will collect “grab” samples while wearing new nitrile gloves and if necessary a properly decontaminated trowel or shovel. The aliquots will be placed in a stainless steel bowl and composited into one sample for laboratory analysis.

Fixated soils will be left in place until analytical results are received. If fixated soils still exceed TCLP limits for non-hazardous disposal, soils will be resampled and/or retreated until they can be properly disposed. When laboratory results indicate that soil meets the TCLP regulatory limit of 5 milligrams per liter for lead and arsenic, and also meets TCLP regulatory limits for other COCs required by the disposal facility, soil will be loaded with an excavator and/or a loader directly into haul trucks. Fixated and stabilized soils are anticipated to be disposed of at a local Subtitle D landfill.

If soil concentrations are higher than what is assumed to be cost effective for treatment versus simple disposal as hazardous waste, arrangements may be made to transport and dispose of that soil at the CWM Subtitle C Landfill located in Emelle, Alabama.

Stockpiles are not anticipated, however, if needed, stockpile size will be determined in the field but will generally not exceed 10 ft in height and all slopes should not exceed a 1:1 vertical to horizontal ratio. In the event that materials are stockpiled and storm water runoff could potentially occur, the stockpiles will be covered with plastic sheeting and bermed to minimize runoff. Stockpile/loading locations may move as excavation activities progress.

AOC Designation

As discussed in **Section 4.3**, remediation waste generated during the excavation will be managed under the AOC policy. The proposed AOC boundary will mimic the property boundary. If the actual AOC boundary is modified it will be documented in the Removal Action Report. Excavated materials may be placed on the ground within the AOC without triggering land disposal restrictions or onsite waste storage timelines. No soil, water, or other materials will be transported outside of the AOC until an appropriate waste characteristic designation has been established for offsite disposal.

4.5.4 Confirmation Sampling

Confirmation samples will be collected upon the conclusion of excavation activities to verify that impacted soil above the RALs has been removed. The proposed confirmation sampling program is presented below.

XRF Analysis

A Thermo Scientific Niton XL3 instrument, or equivalent, will be used to perform XRF field analysis of lead and arsenic in soil. This instrument utilizes an anode and x-ray tube source to detect the presence of metals in the soil sample.

XRF is a method used to determine metal concentrations in a variety of matrixes. XRF analysis has been used as a reliable screening and analysis tool for the detection of specific metals in prepared soil samples. Detection of metals is achieved by bombardment of a sample with a full spectrum of x-rays emitted by a radioactive source element contained within the XRF instrument. These high energy x-rays excite metals within the sample matrix, causing the release of outer shell electrons. The electrons released are received by the instrument detector. The intensity and spectral energy of the electrons released quantify and identify the metal present in the sample.

An XRF analyzer will be used during removal activities as a field analyses mechanism to evaluate when excavation can cease. When each proposed terminal lift (as identified by the pre-characterization sampling and detailed in the final design drawings) has been treated, a composite sample comprised of aliquots removed from the base of the treated grid will be collected. Sampling personnel will collect the aliquot samples while wearing new nitrile gloves for each grid. Some areas, due to depth may require that a larger sample be brought to the surface using excavation equipment or extended decontaminated hand auger and then the aliquots removed from those larger samples. The aliquots will be placed into a stainless-steel bowl and thoroughly mixed into one composite sample. After the XRF stabilizes, a digital readout of the composite sample will be recorded. The location of the XRF composite sample will be recorded for future display on a Site map. XRF operation will be performed in accordance with applicable EPA guidance (EPA Region 4, 2011). XRF detector calibration and results will be documented in a bound field book signed and dated by the XRF technician.

Laboratory Corroboration Samples

Samples from approximately 20 percent of the established grids will be submitted to the laboratory to corroborate the XRF results. A split sample will be collected from the composite sample generated for the XRF analysis. Samples will be placed in a laboratory supplied container, and shipped under chain-of-custody to Eurofins for analysis. Corroboration samples will be analyzed for arsenic and lead according to EPA Methods 6020A and 6010C, respectively. Eurofins holds South Carolina Environmental Laboratory Certification Number 89002002.

4.6 Storm water Management

The water within the work area will be handled in accordance with the Storm Water Pollution Prevention Plan (SWPPP), which was finalized by AECOM and submitted to City of Columbia as part of the land disturbance permit application on April 3, 2017.

Following permit approval, the SWPPP will be forwarded to SCDHEC for approval. Storm water will be diverted away from excavations using berms, swales, and other methods as much as possible by the Contractor. Storm water located within an excavation area will remain within the excavation area until infiltration has occurred and/or managed in accordance with the SWPPP. Groundwater is not expected to be encountered during soil excavation activities.

4.7 Offsite Disposal Activities

The Contractor will be responsible for waste transportation services for anticipated waste streams generated from the removal action. The Contractor, or his trucking subcontractor, will provide the appropriate Department of Transportation (DOT) required placards/labels for the haul trucks. At this time, the anticipated waste streams are lead and arsenic impacted soil and miscellaneous debris (including timbers, concrete, bricks, and trees/shrubs).

The QA/QC Manager and the Certified Hazardous Materials Manager will coordinate collection of representative TCLP waste characterization samples of the waste stream according to the testing and acceptance requirements of the selected disposal facility. The Waste Management Plan (WMP) contained in **Appendix C** provides further information regarding the characterization sampling and testing.

4.8 Groundwater Monitoring Program

Once monitoring well location areas have been restored, a SC certified driller will be contracted to install new monitoring wells to define groundwater conditions. The annual sampling program previously followed at the Site will resume. Groundwater samples will be collected using low-flow techniques and field measurements will be collected for pH, specific conductance, temperature, oxidation reduction potential (ORP), dissolved oxygen (DO), and turbidity following US EPA SOPs. Samples will be submitted to a qualified laboratory and analyzed for total and dissolved lead by SW-846 6010C. Subsequent to the soil removal, necessary groundwater assessment or changes to the groundwater monitoring program will be completed at the direction of SCDHEC. Consistent with a risk based closure effort, the focus of the assessment effort will be to properly characterize the nature and extent of potential downgradient lead concentrations in groundwater attributable to the presumed source of lead at the Site. This may include delineation of groundwater downgradient of historic monitoring well MW-11. Delineation activities will be better defined following completion of the soil removal action, as monitoring well placement will be dependent on third party access agreements and underground utilities.

4.9 Site Restoration

Once confirmation results show soil concentrations within a given cell are below the RALs or groundwater is encountered, the area will be backfilled to grade with soil from an offsite borrow pit suitable for use as structural fill. Backfill materials entering the Site will be directly unloaded into excavated areas and/or will be stockpiled in an appropriate area until ready for use. Prior to delivery, the Contractor will be responsible for providing analytical results from the borrow source. Borrow source samples will be collected for

the analysis of RCRA metals (EPA Methods 6010C/7471B), volatile organic compounds (VOCs) (EPA Method 8260B), semi-volatile organic compounds (SVOCs) (EPA Method 8270D), herbicides (EPA Method 8151A), pesticides (EPA Method 8081B), and polychlorinated biphenyls (PCBs) (EPA Method 8082A). Backfill shall be placed in a maximum loose lift of 12 inches with compaction meeting the 90 percent modified proctor maximum density and be greater than 1% below and less than 3% above optimum moisture content as determined by ASTM D6938. The surface of the excavated area will be seeded to provide a protective vegetative cover to prevent erosion. Per the Tree Survey Memo (**Appendix E**), trees removed to perform the removal action will not need to be replanted.

4.10 Demobilization

Upon completion of all removal activities, equipment will be decontaminated before being transported offsite. All temporary facilities such as construction entrances/exits, staging areas, work areas, temporary structures, stockpiles of excess materials, and other signs of construction activities will be removed. PPE and other waste materials generated during Site activities will be properly disposed of in accordance with local, state, and federal laws and regulations. Areas where removal activities occurred will be left in a clean and stable condition prior to fully demobilizing from the Site. Temporary fencing that may be relocated during excavation activities will be either removed or restored within the property boundary.

5.0 Analytical Program and Field Operations

The following section includes details related to QA/QC protocols needed to achieve project data quality objectives (DQOs).

5.1 Data Quality Objectives

DQOs are qualitative and quantitative statements that specify the quality of the data required to support decisions made during field activities and are based on the end uses of the data. DQO levels address various data uses, and the QA/QC effort and methods that are required to achieve the desired level of data quality. These DQO levels include:

- **Field Screening** (DQO Level I): This DQO level is characterized by the use of portable instruments, such as dust monitoring equipment, field water quality instrumentation, and/or a flame ionization detector or photo ionization detector which can provide real-time data to assist in the optimization of sampling locations and health and safety support. Data can be generated regarding the presence or absence of certain constituents at sampling locations. Level I DQOs have been established for activities presented in this work plan. These DQOs include the air monitoring instrumentation (Thermo Personal DataRAM), and the use of the Yellow Springs Instrument Model 556 water quality meter or equivalent and turbidity meter to measure field parameters during groundwater sampling.
- **Field Analyses** (DQO Level II): This level is characterized by the use of portable analytical instruments, (e.g. XRF Thermo Scientific Niton XL3 or equivalent), which can be used onsite. Depending upon the types of constituents, sample matrix, and personnel skills, qualitative and quantitative data can be obtained. These DQOs include the use of a XRF to provide semi-quantitative data to define lead and arsenic levels at depths within the soil excavation grids and assist with soil removal activities. At least 20% of the XRF data should be corroborated using appropriate analytical methods and QA/QC procedures, and criteria associated with definitive data.
- **Definitive Data** (DQO Level III): These data are generated using rigorous analytical methods, such as approved EPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. These methods produce tangible raw data (e.g., chromatograms, spectra, or digital values) in the form of paper printouts or computer-generated electronic files. Analysis may be conducted at the site or at an off-site location, as long as the QA/QC requirements are satisfied. To be definitive, either the analytical or total measurement error must be determined. Laboratory generated chemical analysis of soil and groundwater samples collected as part of the soil removal activities, to confirm the extent of the impacts as described herein, are considered to be definitive analytical data (i.e., Level III DQO).

5.2 Project Quality Objectives

The precision, accuracy, representativeness, comparability, completeness, and sensitivity of the sampling and analytical procedures must be adequate to allow the data to be used to delineate the constituents of concern (COC) in soil, sediment, or aquatic biota, and make comparisons to remediation goals.

Soil and aqueous (groundwater) samples collected during the proposed investigation will be analyzed for RCRA metals by a South Carolina-certified laboratory. Backfill soil samples will also be analyzed by a South Carolina-certified laboratory for RCRA metals, VOCs, SVOCs, herbicides, pesticides, and PCBs. The laboratory will have a QA/QC program in place that ensures the reliability and validity of the analyses performed. Analytical procedures will be documented as standard operating procedures, which specify the minimum requirements for each procedure. The South Carolina-certified laboratory will generate Definitive Data (DQO Level III).

5.3 Quality Control Samples

Field and laboratory QA/QC samples will be collected to evaluate the representativeness and usability of soil and groundwater analytical data generated as part of the preliminary design investigation described herein. A discussion of specific QC samples, the method of collection, and the frequency of analysis will be in accordance with the NSRC Contract Laboratory requirements and SC DHEC guidelines.

5.4 Measurement Performance Criteria

The measurement performance criteria MPC define the quality elements monitored and the acceptable performance for these elements. Measurement performance criteria for all parameters will be per the analytical method and/or laboratory control limits, whichever is more restrictive.

5.4.1 Precision

Precision is the agreement between a set of replicate measurements without assumption and knowledge of the true value. Analytical precision is the measurement of the variability associated with duplicate (two) or replicate (more than two) analyses. This is accomplished in the laboratory by calculating the relative percent difference (RPD) between lab duplicate sample results, or the RPD between matrix spike (MS) and matrix spike duplicate (MSD) sample results. RPD is calculated using one of the following methods:

$$\text{RPD} = \frac{(R_1 - R_2) \times 100}{R_{\text{Bar}}} \quad \text{or} \quad \text{RPD} = \frac{(S_1 - S_2) \times 100}{S_{\text{Bar}}}$$

where:

R1 and R2 are the first and duplicate results, respectively

R Bar is the average of the two duplicate results

S1 and S2 are the spike and duplicate spike results, respectively

S Bar is the average of the two duplicate spike results.

Historical limits for RPD are determined from pairs of either replicates or spikes. The RPDs must be greater than zero to determine upper warning and control limits. Based on Shewhart's model from the "Handbook for Analytical Quality Control in Water and Wastewater Laboratories" (EPA, 1979), upper control and warning limits can be determined. The Upper Control Limit for pairs of data is defined as follows:

$$\text{Upper Control Limit} = 3.27 \times R$$

where:

R is the average range divided by the number of sets of duplicate measurements.

The Upper Warning Limit for pairs of data is defined as follows:

$$\text{Upper Warning Limit} = 2.51 \times R$$

The spiking procedures will be performed as recommended by the appropriate US EPA methods. The frequency for analysis of spiked duplicate (or replicate) samples will be approximately 1 per 20 samples (excluding QC samples), spaced as evenly through the sequential analysis of samples as practical.

5.4.2 Accuracy

Accuracy is the nearness of a measurement or the mean of a set of measurements to the true value. Accuracy is assessed by the analysis of reference samples and recovery of spiked samples. Sample matrix accuracy is determined by comparing the recovery of target analytes that are spiked into a sample as a MS or MSD to laboratory control limits. Analytical method accuracy is measured by comparing the recovery of target analytes that are spiked in the laboratory control sample of the same matrix as the samples, to a control limit. The Federal Register includes calculations for accuracy on spiked samples for several organics methods. The same calculation may be used for any test amenable to spiking. The percent recovery is defined as follows:

$$P = 100 \times (A - B)/T$$

where:

P is the percent spike recovery

A is the concentration determined on spiked sample

B is the concentration determined on original unspiked sample

T is the true value of spike added.

5.4.3 Representativeness

Representativeness is defined for each sampling and analysis task and is a function of the investigative objectives. Representativeness is achieved through use of the standard field, sampling, and analytical procedures. Representativeness is determined by appropriate

program design, with consideration of elements such as proper sampling locations, procedures, and target species.

5.4.4 Comparability

Comparability is the confidence with which one data set can be compared to another data set. The objective for this QA/QC program is to produce data with the greatest possible degree of comparability. Comparability is achieved by using standard methods for sampling and analysis, reporting data in standard units, normalizing results to standard conditions, and using standard and comprehensive reporting formats. Complete field documentation using standardized data collection forms will support the assessment of comparability. Historical comparability will be achieved through consistent use of methods and documentation procedures throughout the project.

5.4.5 Completeness

Completeness is calculated for the aggregation of data for each analytical group measured for any particular sampling event or other defined set of samples. Completeness is calculated and reported for each analytical method and sample matrix. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set. For completeness requirements, valid results are all results not qualified with an “R” flag. For any instances where samples could not be analyzed for any reason (holding time violations in which resampling and analysis were not possible, spoiled samples, etc.), the numerator of this calculation becomes the number of possible results minus the number of possible results not reported. The formula for calculation of completeness is presented below:

$$\% \text{ Completeness} = \frac{\text{Number of valid results (i.e., non-R-flagged data)}}{\text{Number of possible results}} \times 100$$

The completeness goal for this project will be 90% based on the planned samples for each sample matrix, and will be determined separately for each analytical method.

5.5 Field Operations

Field operations will be conducted in accordance with SC DHEC specifications and procedures. EPA SOPs for excavation activities discussed in this work plan along with discussions of QC checks that will be implemented to assure that the data collected during the remedial action are accurate, representative, reliable, and usable for the intended purpose. Calibration procedures for field instrumentation provided by equipment manufacturers will be incorporated as appendices to the final report.

5.6 Recordkeeping

Documentation of the team’s field activities serves as a basis for technical site evaluation and report preparation. It is essential that field documentation provide a clear, unbiased picture of field activities. Aspects of sample collection, sample handling, and observations will be documented in field books, electronically or on applicable field forms. Bound or electronic field books will be used on work assignments requiring field

activities. Entries into field books will be legibly written in indelible ink and provide a clear record of all field activities.

Instructions and procedures relating to the format and technique by which notebook entries are made are as follows:

- Leave the first two pages blank. They will provide space for a table of contents to be added when the field notes are complete.
- Entries will be made in waterproof ink.
- Entries will be made in language that is objective, factual, and free of personal feelings or other terminology, which might appear unclear or inappropriate.
- Entries will be printed as neatly as possible.
- Entries will be logged in military time format.
- Errors in the field notes will be indicated by drawing a single line through the text, ensuring the text is still legible, and initialing and dating the errors.
- A new page will be started at the beginning of each day's field activities and any remaining blank portion of a page at day's end will be marked out with a single initialed line.
- The person taking notes shall sign, number and date each page.
- Later additions, clarifications, or corrections must be dated and signed.

Instructions and procedures providing guidance on the information to be recorded on field activities are provided below:

1. A new page will be used at the start of each day's activities. The date, time, onsite personnel, and observed weather conditions will be noted. Significant changes in weather conditions will be noted as they occur.
2. Sketches or maps to identify photo and/or sample locations will be included in the field book. Landmarks and/or direction of north will be included.
3. Onsite health and safety meetings or will be documented.
4. As part of the chain-of-custody procedure, sampling information will include sample number, date, time, sampling personnel, sample type, designation of sample as a grab or composite, analysis requested with the analytical method (as appropriate) and any preservative used. Sample locations will be referenced to sample numbers on a site sketch or map.
5. Information for in-situ measurements will include a sample ID number or location ID, date, time, and personnel taking measurements.
6. If onsite interviews occur, relevant information obtained will be recorded. Names of persons interviewed, the interest group represented (if applicable), address, and phone number will be recorded.
7. Any other relevant information, which would be difficult to acquire at a later date, will be recorded.

Copies of field notes and original field data sheets will be presented to the field operations manager as soon as practicable and will be maintained in the project file.

5.7 Sample Designation

Samples collected for specific field analyses or measurement data will be recorded directly in bound or electronic logbooks (field books) and on field forms (as appropriate) using designated sample identification. Standard sample labels will be attached to the sample containers and the labels will carry the designated sample identification and sample analysis procedure.

All samples collected for analysis will be assigned a unique sample identifier. The identifier will link specific samples to the location and, if applicable, the depth from which the sample was collected, sample media, and sample type. The sample identifiers will be recorded on the sample label that is attached to the sample container, in a project field book and/or sample log, on sample chain-of-custody forms, and in the project database. The sample designation references location and includes qualifiers.

Sample Location

The first portion of the sample designation will be a two- to three-letter alphabetic code that will identify the type of sample location as identified below. The codes for investigation-derived waste samples will correspond to a particular container (i.e., drum, tank, etc.) instead of a location.

- SB – Soil Boring,
- Comp – Composite soil sample,
- MW – Monitoring well location,
- IDW – investigation-derived waste sample (sample of waste generated by the SI activities).

The initial alphabetic code will be followed by a sequential numeric code for each of the above location types that specifies the location of the sample horizontally and if appropriate vertically followed by the sampling date (MMDDYY). For example, an excavation base sample collected from grid location H-1 on August 1, 2016 would be identified as sample Comp-H-1-080116. Similarly, an excavation base sample collected from a depth of 2 feet would be designated as Comp-H-1(2)-080116.

Qualifiers The final portion of the sample designation is used to identify quality assurance samples. Samples that are collected for routine analysis only (i.e., not for quality assurance purposes) will not have qualifiers appended. Additionally, samples with a qualifier included in the sample designation are considered secondary and will be used only for data quality assessment. For example, the results from the analysis of a duplicate sample will not be used in the assessment of site conditions. Only the results from the primary sample will be used for assessment. The following qualifiers will be appended to the appropriate sample type:

- DP – duplicate sample, and
- MS/MSD – matrix spike/matrix spike duplicate.

Certain samples will require special sample designations. In general, the samples requiring special designations are QC-related samples and include trip blanks and equipment/rinsate blanks. The procedures for assigning sample designations for these samples are as follows.

A trip blank will accompany each shipping container that contains samples requiring a VOC analysis. The sample designation for trip blanks will be derived using the date the samples are shipped:

1. Begin the sample designation with “TB” (for trip blanks) followed by the numerical month, day, and year (e.g., TB-080116 for August 1, 2016).
2. Add a media identifier code (e.g., S for soil or sediment, GW for groundwater)
3. Add a sequential number if more than one trip blank by media is being shipped on a single day (e.g., 2 for the second of two water trip blanks shipped on the same day).

Equipment blanks will be collected from any equipment used in sample collection or processing that is re-used for more than one sample location and is not equipped with a liner. Equipment blanks will be designated using the same sample designation for the first sample taken after decontamination procedures. The qualifier “RB” will be appended to the sample designation to indicate an equipment rinsate blank. For example, the sample designation for an equipment blank collected on August 1, 2016 after decontamination of a pump, but before sampling monitoring well MW-11, will be MW-11-080116RB.

4. Sampling information regarding blanks will be recorded directly in bound or electronic logbooks (field books) and/or referenced field forms using designated sample identification nomenclature. Standard sample labels will be attached directly onto sample bottleware/containers immediately before or after sample collection. Information on sample labels will include:
 - Unique sample designation;
 - Date and time that the sample was collected;
 - Laboratory analyses that will be conducted on the sample; and
 - Sample preservative (if appropriate); and
 - Initials of person collecting the sample.
5. Completed labels will be secured to the sample container with clear tape.

6.0 Health and Safety

Overall project organization and responsibilities are discussed in **Section 3**. Health and Safety issues onsite will conform to NSRC, AECOM, industry standards, and federal/state/local regulations. AECOM has updated the existing Site specific HASP to include all Site related activities. The HASP is a standalone document; however, highlights of the HASP are provided below.

6.1 Site-Specific Health and Safety Plan

AECOM will implement a Site specific HASP that meets the requirements of 29 CFR 1910.120. The plan will identify the level of protection for each job task and include a contingency plan to protect visitors, passersby, and nearby residents from offsite releases of contaminants (if any). The plan provides guidelines for upgrading or downgrading the level of PPE required in response to changing job conditions. The HASP will be available onsite throughout the duration of the work. A copy of the finalized HASP will be provided to SC DHEC under separate cover for informational purposes only.

The HASP will be prepared in accordance with the most recent Occupational Safety and Health Administration (OSHA), US EPA, American National Standards Institute and National Institute for Occupational Safety and Health (NIOSH) regulations and guidelines. Specifically, the following reference sources will be consulted:

- OSHA 29 CFR 1910.120;
- US EPA Best Management Practices for Soils Treatment Technologies;
- NIOSH/OSHA/United States Coast Guard/US EPA "Occupational Health and Safety
- Guidelines for Activities at Hazardous Waste Sites";
- NIOSH Pocket Guide to Chemical Hazards;
- American Conference of Governmental Industrial Hygienists Threshold Limit Values.

At a minimum, the HASP will provide information concerning:

- Anticipated hazards (chemical, biological, and physical) and hazard mitigation from Site activities will be discussed, documented, and controls will be established to mitigate these hazards. Special emphasis will be placed on hazards associated with lead exposure, excavation safety, and working around heavy equipment;
- Personal Protection Measures (PPE), Qualification and Training Requirements (including lead awareness training), and personnel medical surveillance program requirements;
- Safety and Emergency Procedures - The safety and emergency procedures related to specific Site remediation operations will be discussed;

- Health and Safety Responsibility - The HASP will outline the chain of command for implementing safe operating practices and will outline the responsibilities of personnel expected to be involved in the project;
- Subcontractors - At a minimum, subcontractors will be required to adhere to the AECOM HASP in addition to their own plan (if applicable);
- Site Control and Decontamination;
- Air Monitoring Plan;
- SOPs;
- Safety Data Sheets;
- JSAs; and
- Daily safety meetings.

6.2 Personnel Decontamination Procedures

Details of the personnel decontamination procedures will be contained in the AECOM HASP. Due to the nature of the waste identified as being present at the Site, there is no anticipated requirement for elaborate personnel decontamination procedures for staff visiting the site or in non-intrusive oversight roles. However, in the CRZ, the procedures will, at a minimum, include a boot wash for those activities where personnel could come in contact with potentially contaminated soils, and a hand wash facility.

7.0 Reporting and Schedule

7.1 Reporting

A removal report will be submitted to SC DHEC following final grading and Site restoration. The report will include, at a minimum, the following components:

- project record documents detailing excavation activities;
- as-built drawings;
- copies of waste manifests and weight tickets;
- amount of backfill brought onsite;
- well construction logs;
- regulatory correspondence;
- applicable permits;
- perimeter air monitoring results; and
- waste characterization and confirmatory sampling results.

7.2 Schedule of Activities

The total duration of the Site Removal Action is estimated to be approximately 6 months. The schedule starts upon approval of this RAWP by SCDHEC within 30 days of submittal to the agency. Activity durations are expressed as calendar days. The schedule assumes the following:

- 2 month for obtaining permits, procuring the Contractor and subcontractors;
- 3 months for Site preparation and removal action; and
- 1 month for drafting and submitting the removal report.

However, circumstances that might impact the project schedule include but are not limited to: historical data inaccuracies, permit delays, subcontractor availability, weather, stockpile TCLP failures, physical size of the Site, or other unforeseen instances.

The proposed Site Removal Action implementation schedule is shown on **Figure 6**. The proposed schedule is dynamic and is subject to change.

8.0 References

AECOM, 2017. *Groundwater Monitoring Report and Well Abandonment – November 2016*, AECOM, February 3, 2017.

ETI, 1999. *Continued Hydrogeologic Assessment*, Earth Tech, Inc., May 5, 1999.

MM&A, 2002. *Corrective Action Plan*, Marshall Miller & Associates, Inc., May 3, 2002.

Maher, H.D. Jr., P.E. Sacks, and D.T. Secor, Jr. 1991, “*The Eastern Piedmont in South Carolina*”, *Geology of the Carolinas*, pp 93-108, ed. W.J. Horton, Jr. and V.A. Zullo.

SCDHEC, 2005. Storm Water BMP Field Manual. July 2005. Available at:
http://www.SC DHEC.gov/environment/ocrm/bmp_docs.htm

SC DNR, 2016. <http://www.dnr.sc.gov/geology/> “Geology of South Carolina”, accessed on May 10, 2016.

US Climate Data, 2016. <http://www.usclimatedata.com/> “Climate South Carolina-Columbia” accessed on June 25, 2016.

US EPA, 2009. *Region 9 Preliminary Remediation Goals (PRGs) for Industrial Soil*.

US EPA, 1998. *Management of Remediation Waste Under RCRA*.

USGS, 1996. *Hydrogeology of the SE Coastal Plain Aquifer System in SC and Parts of GA and NC*, United States Geological Survey, 1996.

NSRC and SCDHEC, 2016. *Voluntary Cleanup Contract 16-5988-RP in the matter of Norfolk Southern Wayne Street Site, Richland County and Norfolk Southern Railway Company*. June 2, 2016.

Tables

TABLE 1
PROJECT ORGANIZATIONAL CHART
WAYNE STREET SITE
COLUMBIA, SOUTH CAROLINA

AECOM PERSONNEL	LOCATION	TITLE / CLASSIFICATION	PROJECT RESPONSIBILITIES	CONTACT INFORMATION
Amanda Taylor	Charlotte, NC	Project Director	Project Director	(704) 499-8002
Brandt Morrow	Charlotte, NC	Project Manager	Project Manager	(704) 499-6205
Jon Kucera	Morrisville, NC	Project Engineer	Project Engineer	(919) 416-1387
Bart Eklund	Austin, TX	Principal Scientist	Air Monitoring Program	(512) 419-5436
Betsy Bishop	Golden, CO	CHMM	Waste Management	(303) 216-2558
Martha Meyers-Lee	Morrisville, NC	Project Scientist	QA/QC, Laboratory Coordination	(919) 461-1519
Gregg Donahue	Newark, DE	Senior Scientist	Site Supervisor	(302) 530-7541
Robert Brookshire	Charlotte, NC	Staff Scientist	Site Safety Officer	(704) 499-1103

REGULATORY PERSONNEL	LOCATION	TITLE / CLASSIFICATION	PROJECT RESPONSIBILITIES	CONTACT INFORMATION
Tim Hornosky	Columbia, SC	Site Manager	BLWM Project Manager	(803) 898-0733
Lucas Berresford	Columbia, SC	Section Manager	VCC Program Manager	(803) 898-0747

Notes:

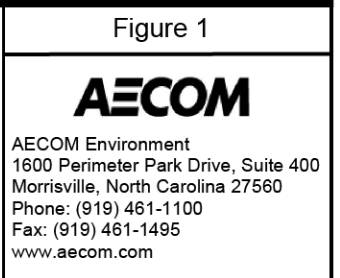
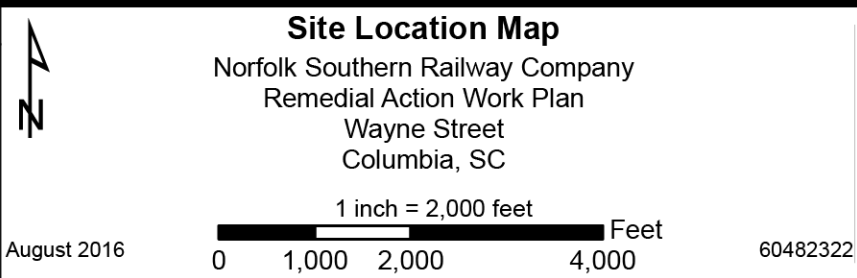
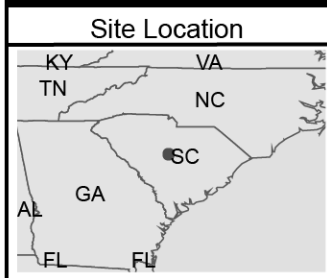
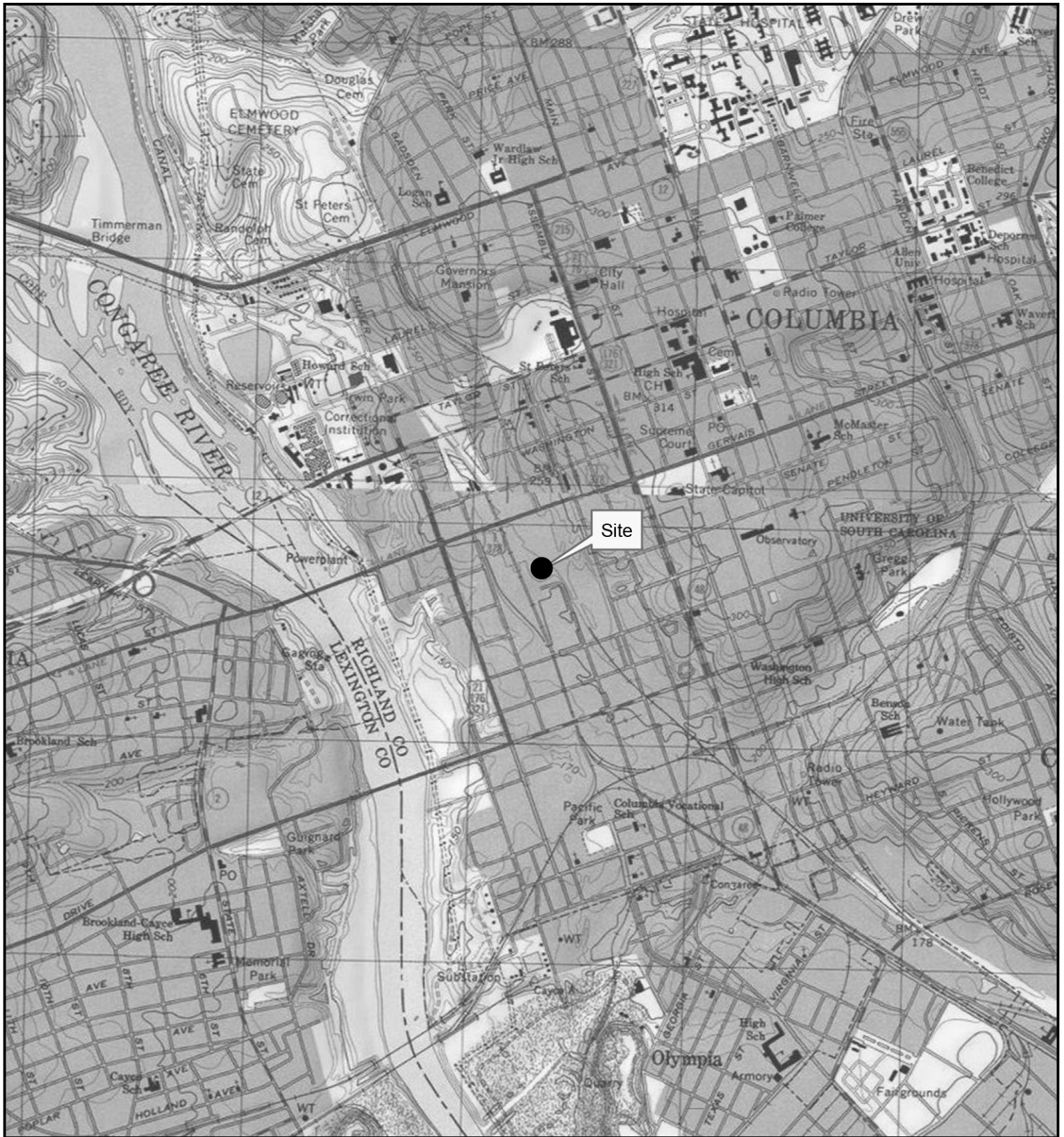
CHMM: Certified Hazardous Materials Manager

QA/QC: Quality Assurance/Quality Control

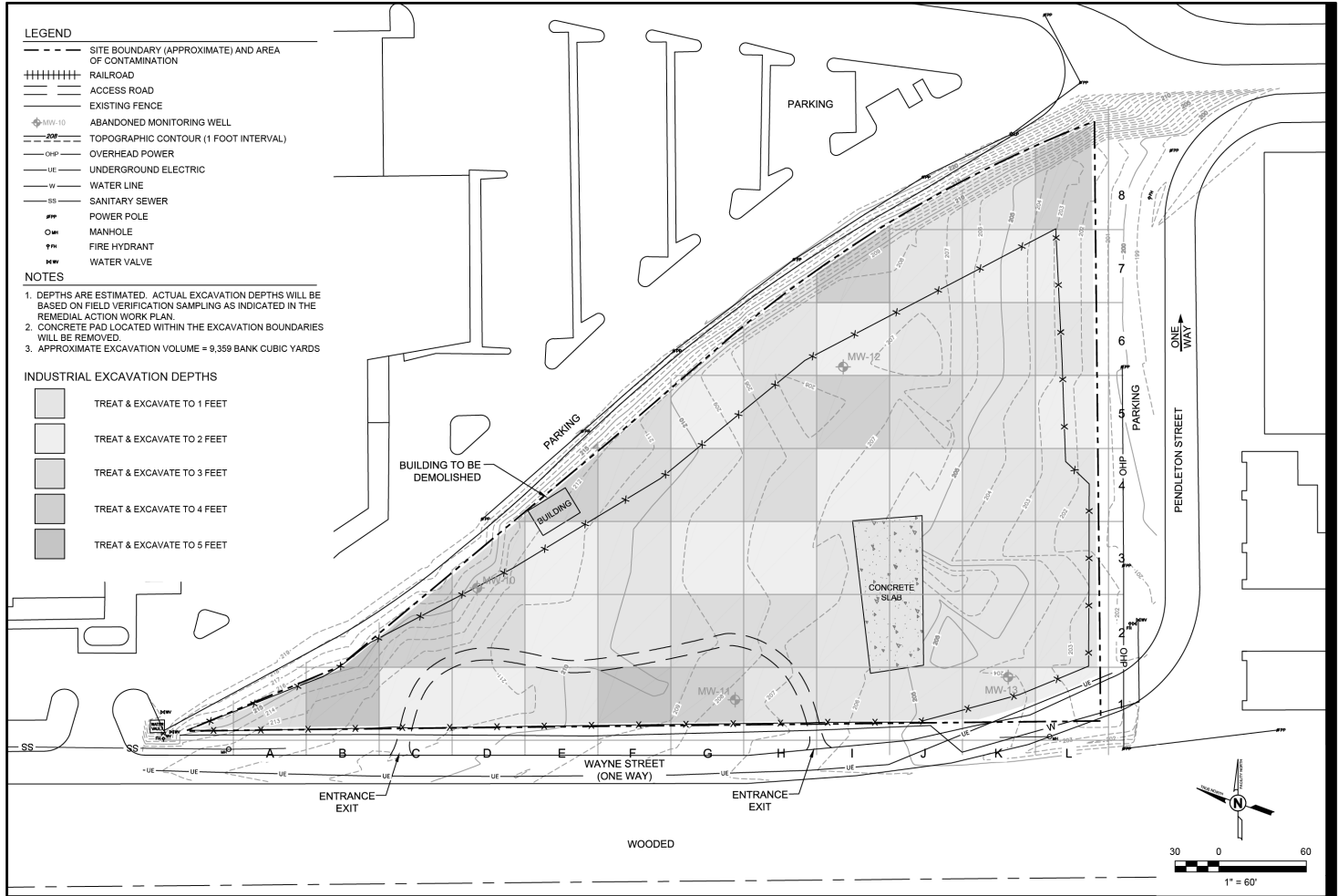
BLWM: Bureau of Land and Waste Management

VCC: Voluntary Cleanup Contract

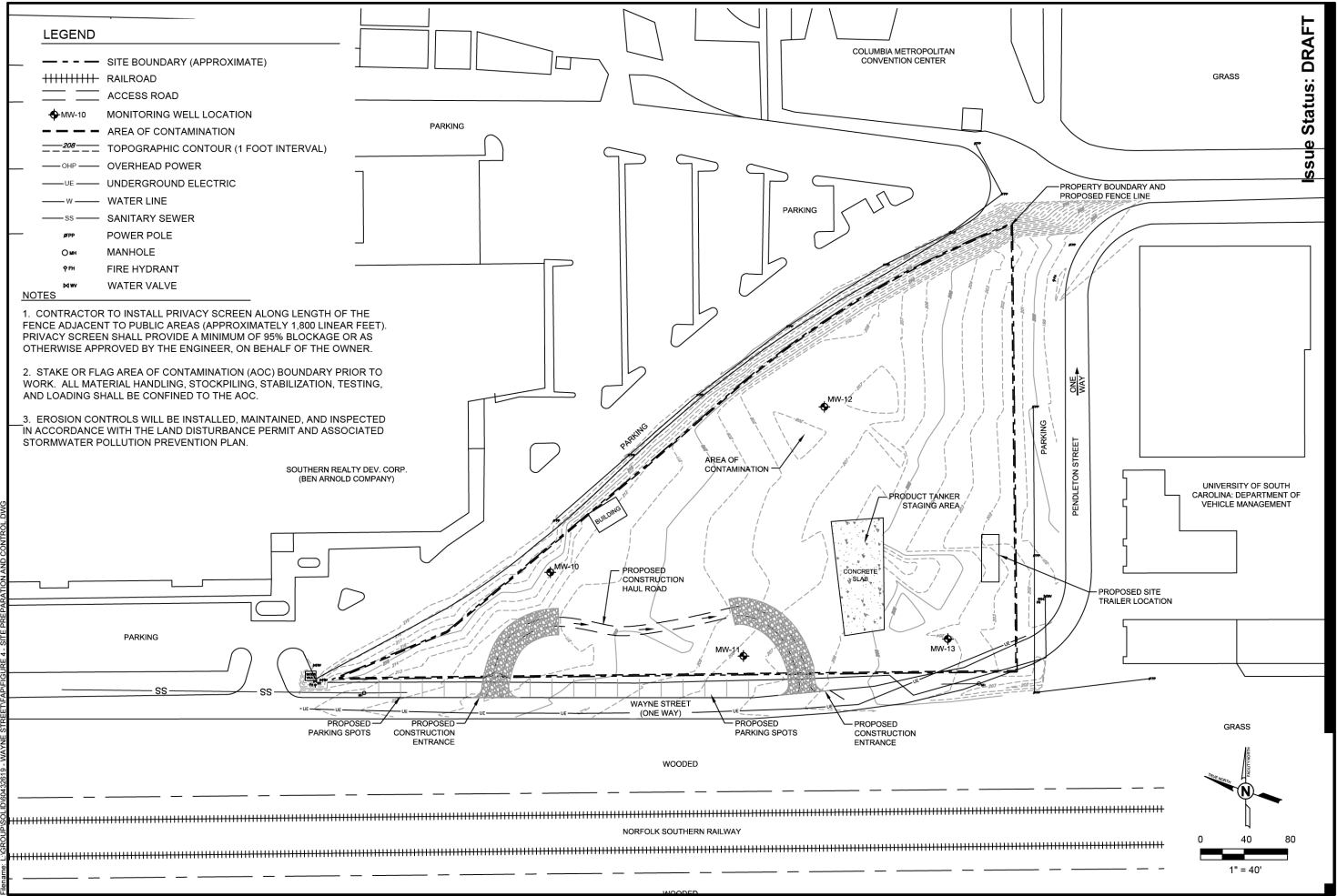
Figures





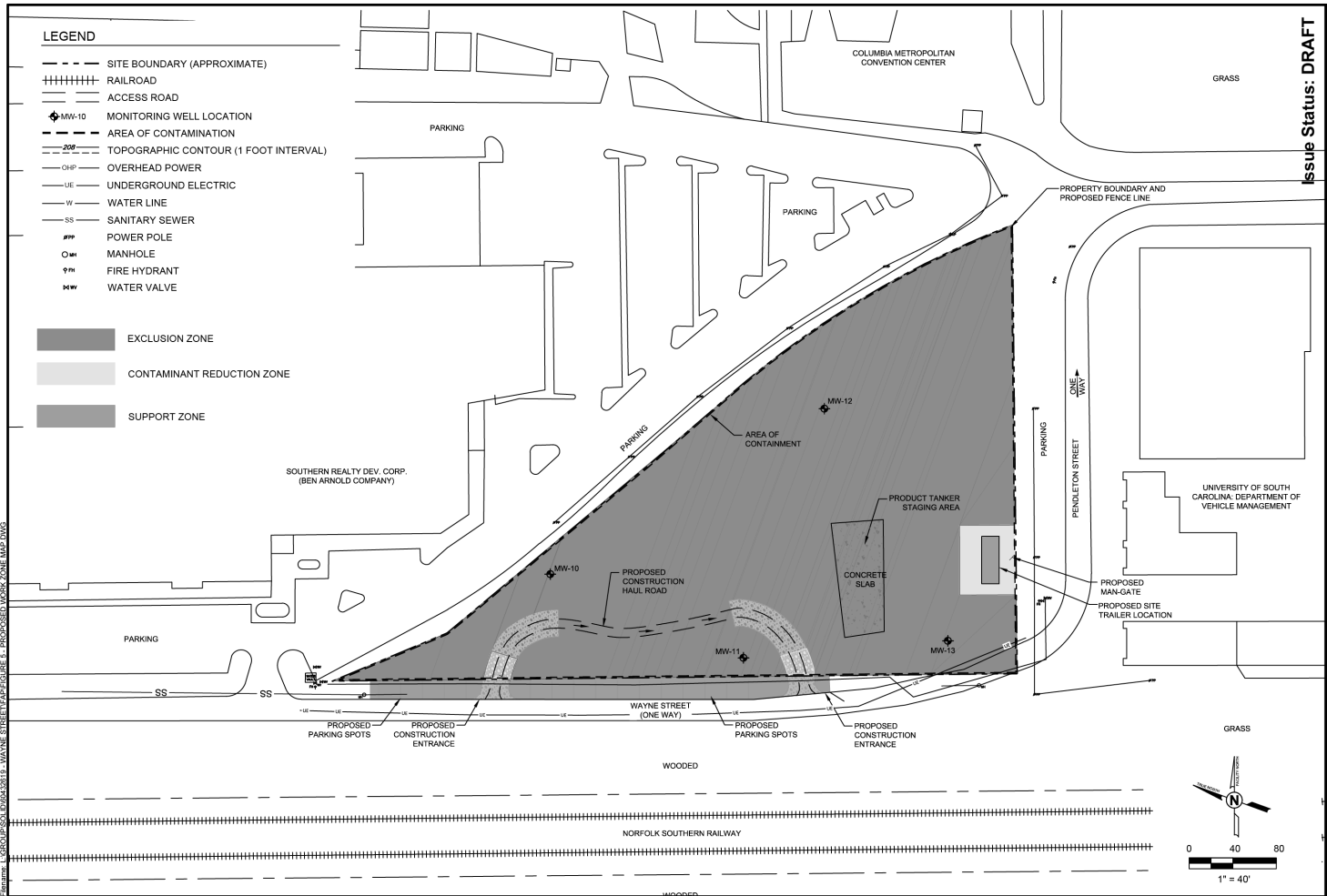


ANSI B 11" x 17" Approved: _____ Checked: _____ Designer: _____ Project Management Initials: _____



Issue Status: DRAFT

ANSI B 11" x 17" Approved Checklist AQ Designer: CC Project Management Initials: Last saved by: FURMAN/NCI(2016-08-10) Last Printed: 2016-08-10
PROJECT: 60482322 - WAYNE STREET CONSTRUCTION - PROPOSED WORK ZONE MAP DWG



Issue Status: DRAFT























Wayne Street Project Schedule - 04/24/17

ID	% Complete	Task Name	Duration	Start	Finish	Predecessor	Resource Names	Milestone	November 10/26	April 11 1/4	September 8/1	January 21 10/10	June 11 2/27	November 12/4
1	0%	1) Agency Milestones	328 days	Tue 8/2/16	Thu 11/2/17			No						
2	0%	Quarterly Status Update	328 days	Tue 8/2/16	Thu 11/2/17		AECOM	No						
3	0%	Quarterly Status Update 4	1 day	Tue 5/2/17	Tue 5/2/17			No						
4	6%	3) RAWP	274 days	Mon 3/28/16	Thu 4/13/17		AECOM	No						
5	100%	RAWP submittal to DHEC	1 day	Fri 4/14/17	Fri 4/14/17		AECOM	No						
6	0%	Approval of RAWP	15 days	Fri 4/14/17	Thu 5/4/17		DHEC	No						
7	99%	5) Treatability Sampling/Results	302 days	Thu 2/11/16	Fri 4/7/17		AECOM,Conti	No						
10	100%	6) Pre-Design Sampling	115 days	Mon 6/27/16	Fri 12/2/16		AECOM	No						
19	24%	7) 2016 GWM and Well Abandonment	60 days	Mon 11/14/16	Fri 2/3/17			No						
23	75%	8) Design and Procurement	150 days	Mon 10/3/16	Fri 4/28/17		AECOM	No						
41	65%	9) Permitting	230 days	Mon 6/27/16	Fri 5/12/17		AECOM,NSRC	No						
46	0%	10) Site Preparation	10 days	Mon 6/5/17	Fri 6/16/17	45FS+15 da	Contractor,AI	No						
58	0%	11) Remedial Action	50 days	Mon 6/19/17	Fri 8/25/17		Contractor,AI	No						
59	0%	Soil	53 days	Mon 6/19/17	Wed 8/30/17			No						
64	0%	Groundwater	7 days	Tue 8/8/17	Wed 8/16/17			No						

Project: Wayne Street Date: 04/24/17	Task		Inactive Milestone		Deadline	
	Split		Inactive Summary		Critical	
	Milestone		Manual Task		Critical Split	
	Summary		Duration-only		Late	
	Project Summary		Manual Summary Rollup		Progress	
	External Tasks		Manual Summary		Manual Progress	
	External Milestone		Start-only			
	Inactive Task		Finish-only			

Wayne Street Project Schedule - 04/24/17

ID	% Complete	Task Name	Duration	Start	Finish	Predecessor	Resource Names	Milestone	November 10/26	April 11 1/4	September 8/1	January 21 10/10	June 11 2/19	November 12/4
67	0%	Survey	5 days	Wed 8/30/17	Tue 9/5/17	62		No						
68	0%	12) Remedial Action Report	75 days	Mon 8/21/17	Fri 12/1/17		AECOM	No						

Project: Wayne Street Date: 04/24/17	Task		Inactive Milestone		Deadline	
	Split		Inactive Summary		Critical	
	Milestone		Manual Task		Critical Split	
	Summary		Duration-only		Late	
	Project Summary		Manual Summary Rollup		Progress	
	External Tasks		Manual Summary		Manual Progress	
	External Milestone		Start-only			
	Inactive Task		Finish-only			

Appendix A
SC DHEC Correspondence



Norfolk Southern Corporation
Environmental Protection
1200 Peachtree Street NE - Box 13
Atlanta, GA 30309
Phone 404-582-5185
steven.aufdenkampe@nscorp.com

Steven Aufdenkampe
Engineer Environmental
Remediation

December 2, 2016

Tim Homosky
South Carolina Department of Health and Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, South Carolina 29201

RE: Removal Action Work Plan Response to Comments
Norfolk Southern Wayne Street Site
1001 Wayne Street
Columbia, Richland County, South Carolina 29201
Site ID # 416941
VCC # 16-5988-RP

Dear Mr. Homosky:

On October 10, 2016, the South Carolina Department of Health and Environmental Control (SCDHEC) issued a comment letter related to the review of the *Removal Action Work Plan* (AECOM, 2016) for the Wayne Street Site located at 1001 Wayne Street, Columbia, South Carolina. Please see the below response to these comments.

1. ***Section 1.6 Overview of Removal Action: The Work Plan indicates that soil stabilization will be conducted in order to reduce mobility of lead and arsenic such that TCLP results can be produced which demonstrate that soil is characteristically non-hazardous and can be disposed of in a Subtitle D landfill. While the Department is amenable to this approach, it should be noted that acceptance of the resulting material is the responsibility of the receiving facility and subject to that facility's Special Waste Acceptance and Implementation Plan (SWAIP). The Department will not compel a receiving facility to accept waste that it deems inconsistent with their SWAIP.***

The Subtitle D receiving facility will be provided with required analytical results to demonstrate soil is characteristically non-hazardous prior to offsite disposal. If soil is determined to be characteristically hazardous an alternative facility is prepared to receive remediation waste from the site as appropriate.

2. ***Section 4.5.3 of the Work Plan, Soil Excavation and Stabilization indicates that TCLP samples will be collected at a minimum of approximately every 500 cubic yards of soil generated after stabilization has taken place. However, as alluded to in Section 4.7 of the Work Plan, waste sampling and analysis frequency must also meet the requirements of the receiving facility.***

Based on experience at similar sites, the Department recommends that more frequent sampling of treated soils (e.g. 1 TCLP per 250 cubic yards) be conducted. This approach results in a very minimal increase in overall costs while reducing the volume of soils that will require re-treatment in the event of a TCLP failure.

The collection of TCLP samples every 500 cubic yards was developed based on the limit established by the proposed receiving facility. However, the *Removal Action Work Plan* (RAWP) and contracting documents for the selected contractor will be revised to include TCLP samples at the 250 cubic yard interval as recommended by SCDHEC.

3. ***Soil Excavation and Stabilization: The VCC requires that the Work Plan include (in part) an evaluation of soil stabilization and excavation technologies. The current Work Plan leaves the specific stabilization technology to the discretion of the subcontractor. It is the Department's understanding that the subcontractor has not been selected yet, and therefore no specific information has been provided regarding the amendments to be utilized or the mechanism by which soils will be handled. These items must be included in the revised Work Plan for review and approval by the Department prior to the commencement of excavation. In addition, the Department recommends that a treatability study be performed to determine the most appropriate amendment chemistry and application rates.***

The Department's understanding is correct; a removal contractor has not been selected yet. Prequalified contractors were allowed the opportunity to complete treatability studies for stabilization technology in late October 2016. During the contractor bid process, the prequalified contractors will be asked to submit a *Technical Execution Plan* (TEP) identifying which stabilization amendment and excavation technologies they intend to use for removal activities. AECOM will provide a revised RAWP following selection of a removal contractor when the stabilization technology is known.

4. ***Section 4.8 Groundwater Monitoring Program: The Work Plan addresses continuation of the existing monitoring program. The Department has previously indicated the need for further assessment to delineate the downgradient extent of groundwater impacted above the lead action level. This requirement is indicated in the VCC under Response Actions 3.C.ii., and may be addressed following the completion of the removal action. Please include a statement in the Work Plan that indicates this.***

Upon completion of the soil removal action, it is anticipated groundwater monitoring wells will be reinstalled and a groundwater monitoring event will be completed. Following completion of this new baseline groundwater monitoring event, impacts to groundwater will be reassessed.

Once information becomes available to adequately address the comments outlined above, a revised RAWP will be submitted to SCDHEC prior to initiating any onsite removal activities. If you have any questions regarding this submittal, please contact me or Brandt Morrow at (704) 499-6205 or brandt.morrow@AECOM.com.

Respectfully Submitted,



Steven Aufdenkampe
Engineer Environmental Remediation



October 10, 2016

Mr. Steven Aufdenkampe
Norfolk Southern Corporation
1200 Peach tree Street, NE – Box 13
Atlanta, GA 30309

RE: Review of Removal Action Work Plan dated August 15, 2016
Norfolk Southern Wayne Street Site
Site ID # 416941
Richland County

Dear Mr. Aufdenkampe:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced Remedial Action Work Plan (Work Plan) which was submitted pursuant to Voluntary Cleanup Contract (VCC) #16-5988-RP. The following comments were generated during this review and require revisions to the Work Plan:

1. Section 1.6 Overview of Removal Action: The Work Plan indicates that soil stabilization will be conducted in order to reduce mobility of lead and arsenic such that TCLP results can be produced which demonstrate that soil is characteristically non-hazardous and can be disposed of in a Subtitle D landfill. While the Department is amenable to this approach, it should be noted that acceptance of the resulting material is the responsibility of the receiving facility and subject to that facility's Special Waste Acceptance and Implementation Plan (SWAIP). The Department will not compel a receiving facility to accept waste that it deems inconsistent with their SWAIP.
2. Section 4.5.3 of the Work Plan, Soil Excavation and Stabilization indicates that TCLP samples will be collected at a minimum of approximately every 500 cubic yards of soil generated after stabilization has taken place. However, as alluded to in Section 4.7 of the Work Plan, waste sampling and analysis frequency must also meet the requirements of the receiving facility.

Based on experience at similar sites, the Department recommends that more frequent sampling of treated soils (e.g. 1 TCLP per 250 cubic yards) be conducted. This approach results in a very minimal increase in overall costs while reducing the volume of soils that will require re-treatment in the event of a TCLP failure.

3. Section 4.5.3 Soil Excavation and Stabilization: The VCC requires that the Work Plan include (in part) an evaluation of soil stabilization and excavation technologies. The current Work Plan leaves the specific stabilization technology to the discretion of the subcontractor. It is

S.C. Department of Health and Environmental Control

the Department's understanding that the subcontractor has not been selected yet, and therefore no specific information has been provided regarding the amendments to be utilized or the mechanism by which soils will be handled. These items must be included in the revised Work Plan for review and approval by the Department prior to the commencement of excavation. In addition, the Department recommends that a treatability study be performed to determine the most appropriate amendment chemistry and application rates.

4. Section 4.8 Groundwater Monitoring Program: The Work Plan addresses continuation of the existing monitoring program. The Department has previously indicated the need for further assessment to delineate the downgradient extent of groundwater impacted above the lead action level. This requirement is indicated in the VCC under Response Actions 3.C.ii., and may be addressed following completion of the removal action. Please include a statement in the Work Plan that indicates this.

Should you have any questions, please do not hesitate to contact me at (803) 898-0733 or by electronic mail at hornostr@dhec.sc.gov.

Sincerely,



Tim Hornosky, P.G.
State Remediation Section
Division of Site Assessment, Remediation & Revitalization
Bureau of Land and Waste Management

cc: R. Gary Stewart, BLWM
Harry Mathis, Midlands EQC (Columbia Office)
Amanda Taylor, AECOM 6000 Fairview Road, Suite 200, Charlotte, NC 28210
BLWM File #416941



Catherine E. Heigel, Director

Promoting and protecting the health of the public and the environment

July 11, 2016

Mr. Steven Aufdenkampe
Norfolk Southern Corporation
1200 Peach tree Street, NE – Box 13
Atlanta, GA 30309

RE: Remedial Action Work Plan Extension Request and Monitoring Well Abandonment Request dated June 30 2016

Norfolk Southern Wayne Street Site
Voluntary Cleanup Contract 16-5988-RP
Richland County

Dear Mr. Aufdenkampe:

The South Carolina Department of Health and Environmental Control (DHEC) has reviewed the above referenced request for a revised submittal date for the Remedial Action Work Plan required under Voluntary Cleanup Contract (VCC) 16-5988-RP. Based on our discussions during a conference call on June 28, DHEC understands that Norfolk Southern is requesting this extension in order to evaluate the potential for cleanup of soils to residential standards. This request is approved. The new due date for the Remedial Action Work Plan is August 15, 2016.

The request to abandon monitoring wells in preparation for remedial activities is also approved. Please contact this office at least five (5) days prior to abandonment activities begin, as required under Section 5 of the VCC.

Should you have any questions, please do not hesitate to contact me at (803) 898-0733 or by electronic mail at hornostr@dhec.sc.gov.

Sincerely,

Tim Hornosky, P.G.
State Remediation Section
Division of Site Assessment, Remediation & Revitalization
Bureau of Land and Waste Management

cc: R. Gary Stewart, BLWM
Harry Mathis, Midlands EQC (Columbia Office)
Amanda Taylor, AECOM 6000 Fairview Road, Suite 200, Charlotte, NC 28210
BLWM File #416941



Catherine E. Heigel, Director

Promoting and protecting the health of the public and the environment

June 23, 2016

Mr. Steven Aufdenkampe
Norfolk Southern Corporation
1200 Peach tree Street, NE – Box 13
Atlanta, GA 30309

RE: Approval of Groundwater Monitoring Report – November 2015

Norfolk Southern Wayne Street Site
Site ID # 416941
Richland County

Dear Mr. Aufdenkampe:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced groundwater monitoring report. The report is approved as written, and no revisions to the report are required.

It is anticipated that a voluntary cleanup contract (VCC) will be executed in the near future, and will result in a schedule and work plan for future response actions. In the event that the VCC is not executed in a timely manner, please submit the next annual groundwater monitoring report to my attention no later than March 31, 2017.

Should you have any questions, please do not hesitate to contact me at (803) 898-0733 or by electronic mail at hornostr@dhec.sc.gov.

Sincerely,

Tim Hornosky, P.G.
State Remediation Section
Division of Site Assessment, Remediation & Revitalization
Bureau of Land and Waste Management

cc: R. Gary Stewart, BLWM
Harry Mathis, Midlands EQC (Columbia Office)
Amanda Taylor, AECOM 6000 Fairview Road, Suite 200, Charlotte, NC 28210
BLWM File #416941



Catherine E. Heigel, Director

Promoting and protecting the health of the public and the environment

June 3, 2016

CERTIFIED MAIL – 9214 8969 0099 9790 1404 7676 33

Return Receipt Requested

Karen Aldridge Crawford
Nelson Mullins Riley & Scarborough LLP
Meridian, 17th Floor
1320 Main Street
Columbia, SC 29201

**Re: Responsible Party Voluntary Cleanup Contract;
Norfolk Southern Wayne Street Site;
Richland County.**

Dear Ms. Crawford:

Please find enclosed a Certified as True and Correct Copy of Responsible Party Voluntary Cleanup Contract 16-5988-RP which was executed by the Department on June 2, 2016.

Per Paragraph 9, Norfolk Southern Railway Company must pay to the Department by certified or cashier's check, the sum of \$5,161.63 to reimburse past costs incurred by the Department. Payment for past costs shall be paid by July 3, 2016, and submitted to:

David Wilkie
South Carolina Department of Health & Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Thank you for your patience and cooperation in this matter. The Department looks forward to working with Norfolk Southern Railway Company to address this Site under the South Carolina Voluntary Cleanup Program. Should you wish to further discuss the terms of the contract, please telephone either Gary Stewart at (803) 898-0778, or me at (803) 898-0882.

Yours very truly,

David Wilkie, Environmental Health Manager
Division of Site Assessment, Remediation & Revitalization
Bureau of Land and Waste Management

Enclosure

cc: Ken Taylor, L&WM
Gary Stewart, L&WM
Harry Mathis, Director, Midlands Region
Tim Hornosky/Pat Vincent/Shawn Reed/Karen Clymer/Linda Jackson, L&WM
BLWM File 416941

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

2600 Bull Street • Columbia, SC 29201 • Phone: (803) 898-3432 • www.scdhec.gov

**VOLUNTARY CLEANUP CONTRACT
16-5988-RP**

**IN THE MATTER OF
NORFOLK SOUTHERN WAYNE STREET SITE, RICHLAND COUNTY
and
NORFOLK SOUTHERN RAILWAY COMPANY**

This Contract is entered into by the South Carolina Department of Health and Environmental Control and Norfolk Southern Railway Company, pursuant to the Brownfields/Voluntary Cleanup Program, S.C. Code Ann. §§ 44-56-710 through 760, as amended, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. §§ 9601 to 9675, as amended, and the South Carolina Hazardous Waste Management Act (HWMA), S.C. Code Ann. § 44-56-200, with respect to the facility known as the Norfolk Southern Wayne Street Site ("Site"). The Norfolk Southern Railway Company property is located at 1001 Wayne Street, Columbia, South Carolina ("Property"). The Property includes approximately 3.01 acres and is bounded generally by Gervais Street on the north; Lincoln Street on the east; Pendleton Street on the south; and Wayne Street on the west. The Property, in part, is identified by the County of Richland as Tax Map Serial Number R08916-11-04A and a legal description of the Property is attached to this Contract as Appendix A.

DEFINITIONS

1. Unless otherwise expressly provided, terms used in this Contract shall have the meaning assigned to them in CERCLA, the HWMA, and in regulations promulgated under the foregoing statutes, or the Brownfields/Voluntary Cleanup Program.
 - A. "NSRC" shall mean Norfolk Southern Railway Company. Norfolk Southern Railway Company is a foreign corporation authorized to do business in South Carolina with its principal place of business located at 1200 Peachtree Street, NW, Atlanta, Georgia.
 - B. "Contract" shall mean this Responsible Party Voluntary Cleanup Contract.
 - C. "Pollutant" or "Contaminant" includes, but is not limited to, any



element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions, including malfunctions in reproduction, or physical deformations, in organisms or their offspring; "contaminant" does not include petroleum, including crude oil or any fraction of crude oil, which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of paragraph (14) of CERCLA, Section 101, 42 U.S.C. Section 9601, et seq. and does not include natural gas, liquefied natural gas, or synthetic gas of pipeline quality or mixtures of natural gas and such synthetic gas.

- D. "Contamination" shall mean impact by a Contaminant or Hazardous Substance.
- E. "Department" shall mean the South Carolina Department of Health and Environmental Control or a successor agency of the State of South Carolina that has responsibility for and jurisdiction over the subject matter of this Contract.
- F. "Hazardous Substance" shall have the same meaning as defined under subparagraphs (A) through (F) of Paragraph (14) of CERCLA, Section 101, 42 U.S.C. Section 9601(14).
- G. "Property" as described in the legal description attached as Appendix A, shall mean that portion of the Site, which is subject to ownership, prospective ownership, or possessory or contractual interest of NSRC.
- H. "Response Action" shall mean any assessment, cleanup, inspection, or closure of a site as necessary to remedy actual or potential damage to public health, public welfare, or the

AW

environment.

- I. "Site" shall mean all areas where a Hazardous Substance, Pollutant or Contaminant has been released, deposited, stored, disposed of, or placed, or otherwise comes to be located; "Site" does not include any consumer product in consumer use or any vessel, as defined in CERCLA.
- J. "Voluntary Cleanup" shall mean a Response Action taken under and in compliance with the Brownfields/Voluntary Cleanup Program, S.C. Code Ann. §§ 44-56-710 to 760, as amended.
- K. "Work Plan" shall mean the plan for additional Response Actions to be conducted at the Site as described in Paragraph 3 of this Contract.

FINDINGS

2. Based on the information known by or provided to the Department, the following findings are asserted for purposes of this Contract:

- A. Owners and Operators: The owners and operators of the Property include the following: Norfolk Southern Railway Company (NSRC)
- B. Property and Surrounding Areas: The Property is located in the City of Columbia, South Carolina. It is roughly triangular in shape and is bordered by Pendleton Street to the south, Wayne Street to the west, and a large commercial/retail building to the north and east.

Historically, the Property was used as a railroad depot, a fertilizer bagging site and an automobile salvage yard. Former uses of the surrounding property include a fuel distribution facility (also known as the Lincoln Street Site) located directly east of the Property and SMI Owens Steel, a steel fabrication facility.

From a report titled "Continuing Soil and Groundwater Quality Assessment Work Plan, Norfolk Southern Railway Company, Lincoln and Wayne Street Sites", dated October 1998,

DW

15 composite surface soil samples and two subsurface composite soil samples were collected for analysis at the Wayne Street Property. Concentrations of lead were detected in the soil up to 25,440 milligrams per kilogram (mg/kg). Concentrations of arsenic were detected in the soil up to 130 mg/kg. Based on the findings of this report additional soil and groundwater investigations were proposed on the Property.

From a report titled "Continued Hydrogeologic Assessment, Norfolk Southern Railway Company, Lincoln Street and Wayne Street Sites", dated May 1999, four monitoring wells were installed on the Wayne Street Property. Lead was detected at a concentration of 2.74 milligrams per liter in monitoring well MW-11, exceeding the maximum contaminant level (MCL) for lead.

A corrective action plan was submitted in May of 2002 titled "Corrective Action Plan, Norfolk Southern Railway Company, Wayne Street Site." The proposed Corrective Action Plan was approved July 10, 2002, but was not implemented.

The annual groundwater monitoring reports indicate that lead has impacted groundwater only in the area of MW-11, but the extent of this impact is uncertain.

RESPONSE ACTIONS

3. NSRC agrees to submit to the Department for review and written approval within thirty (30) days of the execution date of this Contract a Work Plan for the Site that is consistent with the technical intent of the National Contingency Plan. The Work Plan shall be implemented upon written approval from the Department. The Work Plan shall include the names, addresses, and telephone numbers of the consulting firm, the analytical laboratory certified by the Department, and NSRC's contact person for matters relating to this Contract. NSRC will notify the Department in writing of changes in the contractor or laboratory. The Department will review the Work Plan and will notify NSRC in writing of any deficiencies in the Work Plan. NSRC will respond in writing to

SW

the Department's comments within thirty (30) days. The Work Plan and all associated reports shall be prepared in accordance with industry standards and endorsed by a Professional Engineer (P.E.) and/or Professional Geologist (P.G.) duly-licensed in South Carolina and shall set forth methods and schedules for accomplishing the following tasks:

A. Submit a Soil Removal Action Work Plan for the stabilization and offsite removal of soils contaminated by lead and arsenic above levels suitable for industrial use (800 mg/Kg for lead and 30 mg/Kg for arsenic). The Soil Removal Work Plan should, at a minimum, include the following:

- i. Provisions for establishing a grid and sub-grids for the purpose of collecting samples to determine the horizontal and vertical extent of contamination.
- ii. Proposed methods for collecting, compositing, and analyzing samples.
- iii. Evaluation of soil stabilization and excavation technologies, including a description of activities relating to excavation, handling, loading, and transporting contaminated materials and a confirmation sampling plan to demonstrate compliance with soil remedial goals. (Note – All materials removed from the site must be disposed in a properly licensed and compliant disposal facility.)
- iv. Contingencies for managing and treating, if necessary, all rainwater and/or subsurface water that must be removed during excavation activities.
- v. Provisions, if necessary, for the placement of clean backfill and vegetative cover or other cover approved by the Department

B. Removal Action Construction

- i. Implement the soil stabilization technology and soil excavation in accordance with the schedule in the approved



Soil Removal Action Work Plan.

- ii. Submit to the Department a Soil Removal Action Report in accordance with the schedule in the approved Removal Action Work Plan. The Department shall review the report for determination of completion of the stabilization, excavation and offsite removal of soil and sufficiency of the documentation. If the Department determines that the Removal Action is not complete, it will send written notification of such to NSRC, and NSRC shall subsequently conduct additional activities to complete the Removal Action. If the Department determines that the Removal Action is complete but the report is incomplete, the Department shall send to NSRC a letter indicating that revision of the report is necessary. Within thirty (30) days of receipt, unless otherwise agreed, of such letter from the Department, NSRC shall submit a revised report addressing the Department's comments.

C. Post Removal Site Control/Groundwater Investigation

- i. Maintain fence, control erosion and drainage at excavated areas, and maintain vegetative covers.
- ii. Upon completion of the soil stabilization and removal activities, implement a groundwater assessment and monitoring program as outlined and approved in the Soil Removal Action Work Plan

- D. Based on the findings, the Department may require additional removal and/or remedial activities.

4. NSRC shall prepare and submit under separate cover from the Work Plan, a Health and Safety Plan that is consistent with Occupational Safety and Health Administration regulations. The Health and Safety Plan is submitted to the Department for information purposes only. The Department expressly disclaims any liability that

SIGNATURE DW

may result from implementation of the Health and Safety Plan by NSRC.

5. NSRC shall inform the Department in writing at least five (5) working days in advance of all field activities pursuant to this Contract and, if deemed necessary by the Department, shall allow the Department and its authorized representatives to take duplicates of any samples collected by NSRC pursuant to this Contract.

6. Within sixty (60) days of the execution date of this Contract and once a quarter thereafter, NSRC shall submit to the Department a written progress report that must include the following: (A) actions taken under this Contract during the previous reporting period; (B) actions scheduled to be taken in the next reporting period; (C) sampling, test results, and any other data, in summary form, generated during the previous reporting period, whether generated pursuant to this Contract or not; and (D) a description of any environmental problems experienced during the previous reporting period and the actions taken to resolve them.

7. All correspondence which may or are required or permitted to be given by either party to the other hereunder shall be in writing and deemed sufficiently given if delivered by (A) regular U.S. mail, (B) certified or registered mail, postage prepaid, return receipt requested, (C) or nationally recognized overnight delivery service company, or (D) by hand delivery to the other party at the address shown below or at such place or to such agent as the parties may from time to time designate in writing.

Unless otherwise directed in writing by either party, all correspondence, work plans, and reports should be submitted to:

The Department: Tim Hornosky
South Carolina Department Health & Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, South Carolina 29201
hornostr@dhec.sc.gov

AW

NSRC: Steven R. Aufdenkampe
Norfolk Southern Railway Company
1200 Peachtree Street, NE-Box 13
Atlanta, GA 30309

All final work plans and reports shall include two (2) paper copies and one (1) electronic copy on compact disk.

PUBLIC PARTICIPATION

8. Upon execution of this Contract, the Department will seek public participation in accordance with S.C. Code Ann. § 44-56-740(D), and not inconsistent with the National Contingency Plan. NSRC will reimburse the Department's cost associated with public participation (e.g., publication of public notice(s), building and equipment rental(s) for public meetings, etc.).

RESPONSE COSTS

9. NSRC shall, within thirty (30) days of the execution date of this Contract, pay to the Department by certified or cashier's check the sum of five thousand one hundred sixty-one dollars and sixty-three cents (\$5,161.63) to reimburse estimated past response cost incurred by the Department through June 30, 2015 ("Past Costs") relating to the Site. NSRC's payment for Past Costs should be submitted to:

The Department: John K. Cresswell
South Carolina Department of Health & Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

In accordance with §§ 44-56-200 and 44-56-740, NSRC shall, on a quarterly basis, reimburse the Department for Oversight Costs of activities required under this Contract. Oversight Costs include, but are not limited to, the direct and indirect costs of negotiating the terms of this Contract, reviewing Work Plans and reports, supervising corresponding work and activities and costs associated with public participation. Payments will be due within thirty (30) days of the Department's invoice date. The Department shall provide documentation of its Oversight Costs in sufficient detail so as

DW

to show the personnel involved, amount of time spent on the project for each person, expenses, and other specific costs. Invoices shall be submitted to:

NSRC: Steven R. Aufdenkampe
Norfolk Southern Railway Company
1200 Peachtree Street, NE-Box 13
Atlanta, GA 30309

All of NSRC's payments should reference the Contract number on page 1 of this Contract and be made payable to:

The South Carolina Department of Health & Environmental Control

If complete payment of the Past Costs or of the quarterly billing of Oversight Costs is not received by the Department by the due date, the Department may bring an action to recover the amount owed and all costs incurred by the Department in bringing the action including, but not limited to, attorney's fees, Department personnel costs, witness costs, court costs, and deposition costs.

ACCESS

10. The Department, its authorized officers, employees, representatives, and all other persons performing Response Actions under the Department's oversight will not be denied access to the Property during normal business hours or at any time work under this Contract is being performed or during any environmental emergency or imminent threat situation, as determined by the Department (or as allowed by applicable law). NSRC and subsequent owners of the Property shall ensure that a copy of this Contract is provided to any lessee or successor or other transferee of the Property, and to any owner of other property that is included in the Site. If NSRC is unable to obtain access from the Property owner, the Department may obtain access and perform Response Actions. All of the Department's costs associated with access and said Response Actions will be reimbursed by NSRC.

DW

RESTRICTIVE COVENANT

11. If hazardous substances in excess of residential standards exist at the Property after NSRC has completed the actions required under this Contract, NSRC shall prepare, enter into, and record a restrictive covenant. Upon the Department's approval of the items outlined therein, the restrictive covenant shall be signed by the Department and representatives of NSRC and witnessed, signed, and sealed by a notary public. NSRC shall record this restrictive covenant with the Register of Deeds or Mesne Conveyances in Richland County. The signed covenant shall be incorporated into this Contract as an Appendix. A Certificate of Completion shall not be issued by the Department until the restrictive covenant, if required, is executed and recorded. With the approval of the Department, the restrictive covenant may be modified in the future if additional remedial activities are carried out which meet appropriate clean-up standards at that time or circumstances change such that the restrictive covenant would no longer be applicable. The Department may require NSRC or subsequent owners of the Property to modify the restrictive covenant if a significant change in law or circumstances requiring remediation occurs. NSRC or subsequent owners of the Property shall file an annual report with the Department by May 31st of each year detailing the current land uses and compliance with the restrictive covenants for as long as the restrictive covenant remains in effect on the Property. The report must be submitted in a manner prescribed by the Department.

OBLIGATIONS AND BENEFITS

12. Upon execution of this Contract by the Department, NSRC, its signatories, parents, subsidiaries, successors and assigns shall be deemed to have resolved their liability to the State in an administrative settlement for purposes of, and to the extent authorized under 42 U.S.C. § 9613(f)(2), S.C. Code Ann. § 44-56-200, for the matters addressed in this Contract. "Matters addressed" are all Response Actions taken or to be taken at or in connection with this Site under this Contract and any subsequent amendments to the Contract, and all response costs incurred or to be incurred under this Contract and any subsequent amendments to the Contract. Further, by resolving its liability to the State for some or all of a Response Action in this administrative

dw

settlement, NSRC may seek contribution to the extent authorized under 42 U.S.C. § 9613(f)(3)(B), S.C. Code Ann. § 44-56-200 from any person who is not a party to this administrative settlement. A thirty (30) day comment period shall be required prior to the Department's execution of the Contract, and shall commence upon publication of the notice of the proposed Contract in the *South Carolina State Register*.

13. Nothing in this Contract is intended to be, or shall be construed as, a release or covenant not to sue for any claim or cause of action, past or future, that the Department may have against a responsible party who is not a signatory to the Contract and who is not a signatory's parent, subsidiary, successor and assign.

14. Subject to Paragraph 16, nothing in this Contract is intended to limit the right of the Department to undertake future Response Actions at the Site or to seek to compel parties to perform or pay for costs of Response Actions at the Site. Nothing in this Contract shall in any way restrict or limit the nature or scope of Response Actions that may be taken or be required by the Department in exercising its authority under State and Federal law.

15. Subject to the provisions of Paragraph 16, nothing in this Contract is intended to be or shall be construed as a release or covenant not to sue for any claim or cause of action that the Department may have against NSRC for any matters not expressly addressed by and settled through this Contract.

16. Upon successful completion of the terms of this Contract, NSRC shall submit to the Department a request for a Certificate of Completion.

Once the Department determines that NSRC has successfully and completely complied with this Contract, the Department, pursuant to S.C. Code Ann. § 44-56-740(A)(5) and (B)(1), will give NSRC a Certificate of Completion that provides a covenant not to sue to NSRC, its signatories, parents, subsidiaries, successors and assigns for the work done in completing the Response Actions specifically covered in the Contract and completed in accordance with the approved work plans and reports.

SW

The covenant not to sue and administrative settlement for purposes of contribution protection are contingent upon the Department's determination that NSRC successfully and completely complied with the Contract.

In consideration of the Department's covenant not to sue, NSRC, its signatories, parents, subsidiaries, successors and assigns agree not to assert any claims or causes of action against the Department arising out of activities undertaken at the Site or to seek other costs, damages, or attorney's fees from the Department arising out of activities undertaken at the Site, except for those claims or causes of action resulting from the Department's intentional or grossly negligent acts or omissions.

17. NSRC and the Department each reserve the right to unilaterally terminate this Contract. Termination may be accomplished by giving a thirty (30) day advance written notice of the election to terminate this Contract to the other party. Should NSRC elect to terminate, it must submit to the Department all data generated pursuant to this Contract, and certify to the Department's satisfaction that any environmental or physical hazard shall be stabilized and/or mitigated such that the Site does not pose a hazard to human health or the environment that did not exist prior to any initial Response Action addressing Contamination identified in this Contract.

18. The Department may terminate this Contract only for cause, which may include but is not limited to, the following:

- A. Events or circumstances at the Site that are inconsistent with the terms and conditions of this Contract;
- B. Failure to complete the terms of this Contract or the Work Plan;
- C. Failure to submit timely payments for Past Costs and/or for Oversight Costs as defined in Paragraph 9 above;
- D. Additional Contamination or releases or consequences at the Site caused by NSRC its parents, subsidiaries, successors and assigns;
- E. Providing the Department with false or incomplete information or knowingly failing to disclose material information;
- F. Change in NSRC's or its parents, subsidiaries, successors and

[Signature]

assigns business activities on the Property or uses of the Property that are inconsistent with the terms and conditions of this Contract;
or

- G. Failure by NSRC to obtain the applicable permits from the Department for any Response Action or other activities undertaken at the Property.

19. Upon termination of the Contract under Paragraph 17 or 18, the covenant not to sue and administrative settlement for purposes of contribution protection shall be null and void. Termination of the Contract by NSRC or the Department does not end the obligations to reimburse Oversight Costs already incurred by the Department and payment of such costs shall become immediately due.

20. The signatories below hereby represent that they are authorized to and enter into this Contract on behalf of their respective parties.

SIGNATURE



THE SOUTH CAROLINA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL CONTROL

BY: Donald G. Neel for DATE: 6/2/2016
Daphne G. Neel, Chief
Bureau of Land and Waste Management
Environmental Quality Control

Clair H. Price DATE: 5/26/16
Reviewed by Office of General Counsel

NORFOLK SOUTHERN RAILWAY COMPANY

R.P. Russell DATE: 3/10/16
Signature

Richard P. Russell
Printed Name and Title
System Director
Environmental Protection

DW

APPENDIX A

Legal Description of the Property

County of Richland
Tax Map Serial Number R08916-11-04A

All that certain piece, parcel, lot or tract of land, with any improvements thereon, situate, lying and being in the City of Columbia, County of Richland, State of South Carolina, being shown and delineated as 3.0150 Acres on a property survey prepared for Southern Realty Dev. Corp. by Steadman & Associates, Inc., dated January 23, 2014, and according to said survey, having the following measurements and boundaries:

Beginning at a steel rod located on the northeast corner of Wayne Street and Pendleton Street, and thence proceeding along the eastern boundary of the right-of-way of Wayne Street the following courses and distances: N 20° 37' 34" W for a distance of 571.47 feet to a rebar marker; thence continuing and running N 20° 27' 54" W for a distance of 56.31 feet to a rebar marker; thence turning and proceeding along property of Southern Realty Dev. Corp. the following courses and distances: along a curve having a chord bearing of S 42° 33' 36" E for a chord distance of 114.17 feet and an arc distance of 114.17 feet to a rebar marker; thence turning and running S 59° 50' 38" E for a distance of 239.93 feet to a rebar marker; thence along a curve having a chord bearing of S 60° 55' 42" E for a chord distance of 118.26 feet and an arc distance of 118.26 to a rebar marker; thence along a curve having a chord bearing of S 50° 18' 40" E for a chord distance of 283.00 feet and an arc distance of 284.24 to a rebar marker located on the northern right-of-way of Pendleton Street; and thence turning and proceeding along the northern boundary of the right-of-way of Pendleton Street S 69° 22' 54" W for a distance of 411.25 feet to a steel rod, being the point of beginning.

TMS#:08916-11-04A

Appendix B

Historical Soil Data

Table 1
Summary of Sampling Results
Wayne Street Site
Columbia, South Carolina

January 17, 2017

Grid Number		Sample Depth	Pb Conc (mg/kg)	As Conc (mg/kg)	Grid Area (sf)	Estimated Removal Depth (ft)	Estimated Volume (cyd)	Justification for Depth
A	1	0-1	59	4.1	1,070	3	119	b
		0-1	2,200	29				
		1-2	2,000	63				
		2-4	22	4				
B	1	0-1	7,400	57	2,132	5	395	b
		1-2	3,700	30				
		2-3	13,000	87				
		3-4	22	1.4				
		0-1	11,000	51				
		1-2	4,400	20				
		2-3	8,600	460				
		3-4	3,100	370				
		4-6	22	3.7				
C	1	0-1	82,000	49	1,996	2	148	a
		1-2	8,100	8.2				
		2-3	260	1.8				
D	1	0-1	5,800	91	1,969	3	219	a
		1-2	12,000	33				
		3-4	29	2.9				
E	1	0-1	6,100	76	1,942	1	72	a
		1-2	99	5.4				
F	1	0-1	8,100	55	1,915	5	355	c
		1-2	8,900	71				
		2-3	950	13				
		2-4	1,800	28				
		4-6	47	7				
G	1	0-1	40,000	66	1,888	5	350	a
		1-2	170,000	140				
		1-2	260,000	110				
		2-3	11,000	54				
		3-4	3,500	14				
		5-6	17	2.5				
H	1	0-1	180,000	46	1,861	1	69	a
		1-2	89	1.8				
I	1	0-1	3,800	9.8	1,834	1	68	a
		1-2	26	3.5				
		0-1 DUP	43	2.8				

Table 1
Summary of Sampling Results
Wayne Street Site
Columbia, South Carolina

January 17, 2017

Grid Number		Sample Depth	Pb Conc (mg/kg)	As Conc (mg/kg)	Grid Area (sf)	Estimated Removal Depth (ft)	Estimated Volume (cyd)	Justification for Depth
J	1	0-1	520	11	1,807	1	67	c
K	1	0-1	510	24	1,555	1	58	c
L	1	0-1	33,000	68	626	2	46	a
		1-2	25,000	64				
		1-2	21,000	20				
		2-4	8.88	4.80				
C	2	0-1	7,900	33	2,073	4	307	a
		1-2	4,500	24				
		2-3	11,000	33				
		3-4	52,000	130				
		4-6	9.39	4.5				
D	2	0-1	5,600	36	2,500	3	278	b
		0-2	6,690	45				
		2-4	16.5	6.5				
E	2	0-1	9,100	60	2,500	2	185	a
		1-2	7,000	80				
		2-3	120	7.6				
F	2	0-1	5,100	21	2,500	1	93	a
		1-2	600	11				
G	2	0-1	8,900	27	2,500	3	278	a
		1-2	3,900	48				
		2-3	5,300	51				
		3-4	18	3.5				
H	2	0-1	28,000	52	2,500	3	278	a
		1-2	6,900	39				
		2-3	1,200	9.3				
		3-4	22	7.3				
I	2	0-1	6,700	17	2,500	1	93	a
		1-2	20	2.6				
J	2	0-1	4.4	1.5	2,500	1	93	c
K	2	0-1	730	8.2	2,500	1	93	c
L	2	0-1	510	13	2,101	1	78	c
D	3	0-1	3,400	66	1,674	3	186	b
		1-2	13,000	35				
		2-4	74	7				
E	3	0-1	19,000	30	2,500	2	185	a
		1-2	3,800	31				
		2-4	13	7				

Table 1
Summary of Sampling Results
Wayne Street Site
Columbia, South Carolina

January 17, 2017

Grid Number		Sample Depth	Pb Conc (mg/kg)	As Conc (mg/kg)	Grid Area (sf)	Estimated Removal Depth (ft)	Estimated Volume (cyd)	Justification for Depth
F	3	0-1	78	2.7	2,500	1	93	c
G	3	0-1	3,100	100	2,500	2	185	a
		0-2	21	5				
H	3	0-1	12,000	63	2,500	2	185	a
		1-2	10,000	36				
		2-3	450	24				
I	3	0-1	63	6.4	2,500	1	93	a
J	3	0-1	69	5.5	2,500	1	93	a
K	3	0-1	1,200	7.5	2,500	1	93	a
		1-2	40	4.0				
L	3	0-1	240	8.5	2,074	1	77	c
E	4	0-1	4,900	24	1,250	3	139	b
		0-1 DUP	36,000	35				
		1-2	2,600	15				
		2-3	2,700	29				
		2-4	2	6				
		0-1	8,600	27				
		1-2	24	9.2				
F	4	0-1	28,000	51	2,492	3	277	b
		1-2	16,000	41				
		2-4	13	6				
G	4	0-1	1,200	9.7	2,500	1	93	a
		1-2	12	5.3				
H	4	0-1	2,900	41	2,500	3	278	b
		1-2	83	35				
		2-4	39.5	6.5				
I	4	0-1	860	9.8	2,500	2	185	a
		0-2	4,730	35.2				
		2-4	166	28.9				
J	4	0-1	46,000	43	2,500	2	185	a
		1-2	4,200	40				
		2-3	440	19				
K	4	0-1	2,500	24	2,500	1	93	a
		0-1	3,600	7.3				
		1-2	520	9.5				
L	4	0-1	2,500	29	2,047	1	76	a
		1-2	33	6.2				

Table 1
Summary of Sampling Results
Wayne Street Site
Columbia, South Carolina

January 17, 2017

Grid Number		Sample Depth	Pb Conc (mg/kg)	As Conc (mg/kg)	Grid Area (sf)	Estimated Removal Depth (ft)	Estimated Volume (cyd)	Justification for Depth
F	5	0-1	8,800	36	889	3	99	Assumed excavation would extend
		1-2	8,100	31				
G	5	0-1	2,600	24	3,010	2	223	a
		1-2	3,400	35				
		2-3	31	3.9				
		0-1	90	11				
H	5	0-1	2,400	35	2,500	3	278	Assumed one more foot in depth
		1-2	28	49				
I	5	0-1	1,000	44	2,500	4	370	a
		0-2	2,490	22				
		2-4	652	48				
		4-6	8	6				
J	5	0-1	4,000	40	2,500	3	278	b
		1-2	3,500	32				
		5-6	20	5				
K	5	0-1	13	6.7	2,500	1	93	c
L	5	0-1	5,300	42	2,020	2	150	a
		2-4	226	14				
H	6	0-1	94	5.1	2,543	1	94	c
		0-1	100	6.0				
I	6	0-1	2,400	29	2,500	2	185	a
		1-2	6,600	15				
		2-3	230	7.8				
J	6	0-1	4,200	36	2,500	1	93	a
		1-2	180	16				
K	6	0-1	5,700	52	2,500	1	93	a
		1-2	8.2	1.8				
L	6	0-1	34,000	86	1,993	1	74	a
		0-1 DUP	3,100	82				
		1-2	59	6.6				
I	7	0-1	38	6.3	1,829	4	271	a
		0-1	140,000	43				
		1-2	58,000	53				
		2-4	3,970	34				
		4-6	7	6				

Table 1
Summary of Sampling Results
Wayne Street Site
Columbia, South Carolina

January 17, 2017

Grid Number		Sample Depth	Pb Conc (mg/kg)	As Conc (mg/kg)	Grid Area (sf)	Estimated Removal Depth (ft)	Estimated Volume (cyd)	Justification for Depth
J	7	0-1	300	8.2	2,500	1	93	a
		0-1	350	19				
K	7	0-1	11,000	50	2,500	2	185	a
		1-2	2,300	52				
		2-3	120	20				
L	7	0-1	8,700	36	1,966	2	146	a
		0-2	2,980	120				
		2-4	20	10				
K	8	0-1	5,100	43	3,031	1	112	a
		1-2	40	9.2				
L	8	0-1	17,000	38	2,453	3	273	b
		1-2	11,000	29				
		2-4	10	9				
		0-1	140	130				
		0-1	190	82				
Total Excavation Volume (CYD)							9,359	

Notes

8,100 Shaded cells indicate the concentration of Pb or As was above the standard at the deepest sample depth.
Pb = lead
As = Arsenic
cyd = cubic yards
DUP = Duplicate
mg/kg = milligrams per kilogram
std = standard
Estimated removal depth is based on soil sampling results:
a - Assumed that terminal depth was at the top of the next foot since sample interval was the entire foot
b - Assumed terminal depth was at half the distance of the next sample horizon since the next sample horizon was 2-ft
c - Assumed horizon of 1 foot depth due to SCDHEC requiring soil removal to 1 feet deep at a minimum
Industrial Soil Screening Levels (SSLs), (EPA, November 2015)

Appendix C
Waste Management Plan



Environment

Submitted on behalf of
Norfolk Southern Railway
Company

Submitted by
AECOM
Sabre Building
Suite 300
4051 Ogletown Road
Newark, DE 19713

Project-Specific Waste Management Plan for Removal Action

Wayne Street Site
Columbia, South Carolina

Project #: 60482322
August 2016

Prepared By:

A handwritten signature in black ink, appearing to read "Elizabeth Bishop", is written over a horizontal line.

Elizabeth Bishop
Senior Waste Engineer

Reviewed By:

A handwritten signature in black ink, appearing to read "Jon Amsterdam", is written over a horizontal line.

Jon Amsterdam
Waste Specialist

Waste Management Plan Training Acknowledgement

Project Name: Wayne Street Project Number 60482322

I have read, understood, and agree with the waste management protocols presented in the Waste Management Plan and the information discussed in the waste management briefing. I also understand that this plan will serve as guidance and training for waste management activities I may need to perform as part of this contract.

Printed Name	Organization	Signature	Date

Personnel waste management plan training conducted by:

Name Signature Date

Table of Contents

1.0 Purpose and Site Information	1
1.1 Purpose	1
1.2 Hazardous Waste Generator Status	1
1.3 Hazardous Waste Generator Requirements	1
1.3.1 Episodic Generation	1
1.3.2 Large Quantity Generator (LQG)	1
1.3.3 Very Small Quantity Generator (VSQG), Formerly Conditionally Exempt Small Quantity Generator (CESQG)	2
2.0 Scope of Work	3
3.0 Generator Waste Classification	5
3.1 Potential Federal and State Waste Codes	5
3.1.1 Listed RCRA Waste	5
3.1.2 TSCA Waste	5
3.1.3 Characteristic RCRA Waste	5
4.0 Waste Management Procedures	6
4.1 Project Waste	6
4.2 Special Wastes	7
4.2.1 Used Oil/Hydraulic Fluids	7
4.3 Solid Waste	7
5.0 Waste Handling Procedures	8
5.1 Waste Container Inventory Documentation	8
5.2 Container Labeling Instructions	8
5.3 Waste Container Storage Requirements	8
5.4 Container Storage Time Limits and Inspection Requirements	8
5.5 Temporary Stockpiles for RCRA Non-Regulated Wastes	8
5.6 Temporary Stockpiles for RCRA Regulated Wastes	9
6.0 Spills and Spill Reporting Policy	10
6.1 Project Contacts	10
6.2 Agency Spill Reporting Requirements and Contacts	11

List of Appendices

Appendix A	Waste Management Field Documentation Form – For Materials Removed from the AOC
Appendix B	Waste Container Labels
Appendix C	90/180-Day – Accumulation Area Inspection Log

1.0 Purpose and Site Information

1.1 Purpose

Several areas of the Wayne Street site require removal to meet the voluntary clean-up objectives outlined in an agreement between Norfolk Southern Railway Company (NSRC) and South Carolina Department of Environmental Control (SCDHEC). This plan addresses waste generation, on-site storage, and ultimate disposal requirements for soil and debris removed under the voluntary cleanup action.

The nature of environmental remediation lends itself to the generation of solid waste, hazardous waste, and investigation derived waste. This plan will outline general site waste generation information, classification justification, and storage and disposal procedures for project generated waste. This plan will be used by field teams associated with NSRC.

1.2 Hazardous Waste Generator Status

The Wayne Street site is considered a Very Small Quantity Generator (VSQG) of Resource Conservation and Recovery Act (RCRA) hazardous waste. The facility's U.S. Environmental Protection Agency (EPA) generator identification number is SCR000778688.

Although the site is currently a VSQG, if more than 220 pounds (approximately 1/2 drum of soil or water) of hazardous waste are generated in a month, the generator status will change. Given the pending large removal action, there is potential for the generator status to change from VSQG to Large Quantity Generator (LQG). Therefore, this plan will include the requirements of both classes of generators. AECOM anticipates that after the completion of this removal action, the site will close their EPA ID number.

1.3 Hazardous Waste Generator Requirements

1.3.1 Episodic Generation

Generators may periodically exceed their normal generation limits in any given calendar month. If the amount of waste generated in a given calendar month places the generator in a higher category, the generator is responsible for complying with all applicable requirements of that category for all waste generated during that calendar month. For example, if a generator produces 300 kg of hazardous waste in March, that waste must be managed in accordance with the SQG regulations; if the same generator produces 1,500 kg of hazardous waste in April, that waste must be managed in accordance with the LQG regulations (51 FR 10146, 10153; March 24, 1986).

As a general rule, NSRC will segregate waste generated at a higher episodic generator status from the routine lower generator status. Therefore, NSRC will be responsible for managing only the episodic waste under the higher episodic generator status.

1.3.2 Large Quantity Generator (LQG)

As a LQG, the following general hazardous waste generator requirements are applicable for the NSRC Former Wayne Street site along with any applicable site procedures.

- EPA/State must be notified of any hazardous waste activity.

- Hazardous waste on-site is allowed to accumulate no longer than 90 days.
- There is no limit on the quantity of hazardous waste that can be accumulated on-site.
- Accumulation start date must appear on each waste container.
- As necessary, the words “Hazardous Waste” are required on each container.
- The container storage location must be at least 50 feet from property line.
- Hazardous waste treatment is allowed in accumulation units.
- A manifest must be used to ship hazardous waste off-site.
- Hazardous waste must be shipped using transporters and facilities that have EPA ID numbers.
- The site must prepare land disposal restriction (LDR) notifications/certifications.
- The site must conduct personnel training.
- The site must have a preparedness and prevention plan on file at the site.
- The site must have a contingency plan that outlines site emergency procedures on file with local emergency responders.
- The site must prepare and file on-site all hazardous waste records.

1.3.3 Very Small Quantity Generator (VSQG), Formerly Conditionally Exempt Small Quantity Generator (CESQG)

As a VSQG, the following general hazardous waste generator requirements are applicable for the Wayne Street site along with any applicable site procedures.

- EPA/State must be notified of any hazardous waste activity.
- There is no limit to the on-site accumulation time for hazardous waste.
- Less than 1,000 kg of hazardous waste, 1 kg of acute hazardous waste, or 100 kg residue or contaminated soil from the cleanup of acute hazardous waste spill can be accumulated on-site.
- Accumulation start date must appear on each waste container.
- As necessary, the words “Hazardous Waste” are required on each container.
- The container storage location must be at least 50 feet from property line.
- Hazardous waste treatment is allowed in accumulation units.
- A manifest must be used to ship hazardous waste off-site.
- Hazardous waste must be shipped using transporters and facilities that have EPA ID numbers.
- The site must prepare LDR notifications/certifications.
- The site must conduct personnel training.
- The site must prepare and file on-site all hazardous waste records.
- The site must retain supporting documentation or analytical to support waste classifications of hazardous and solid waste.

2.0 Scope of Work

This project-specific waste management plan (PSWMP) will document the planning for the site investigation for the Wayne Street site located in Columbia, South Carolina.

The following scope of activities will be conducted by AECOM or by its designated subcontractor(s):

- Designate an area of contamination (AOC) that can be used to stockpile waste materials prior to loading (see Figures 4 and 5 included with the Remedial Action Work Plan).
- Abandon four existing monitoring wells at the site prior to starting work.
- Break-up and stockpile surface concrete pads into chunks no larger than 2' X 2' X 2'.
- Remove any protruding rebar from the concrete using cold cutting tools. Stockpile rebar within the AOC for recycle by contractor.
- Delineate RCRA non-hazardous soils and concrete for removal, stockpiling, and loading for disposal.
- Delineate RCRA hazardous soils and concrete for stabilization within the AOC to meet treatment standards of < 5.0 mg/L lead (Pb) and < 5.0 mg/L arsenic (Ar) by Toxicity Characteristic Leaching Procedure (TCLP).
- Treat RCRA hazardous soils in place within the AOC to meet treatment standards.
- Re-treat any soil batches to meet the treatment standards.
- Segregate and stockpile within the AOC any soils that cannot be treated to meet the treatment standard.
- Direct load soils, concrete, and mixtures of the soil and concrete for transportation to the selected off-site disposal vendors.
- Decontaminate excavation equipment.
- Backfill and/or regrade and restore vegetation.

Project Team Responsibilities

Task	Organization	Individual
Oversee waste management activities.	AECOM WM Network	AECOM Project Manager of Site Supervisor
Conduct waste coordinator duties. <ul style="list-style-type: none"> – Order containers – Schedule waste pick ups 	AECOM, may be delegated to construction contractor selected	Brandt Morrow or the subcontractor Site Representative (SR)
Label containers.	AECOM, may be delegated to construction contractor selected	SR
Move waste into the waste accumulation area.	AECOM, may be delegated to construction contractor selected	Brandt Morrow or the SR
Complete/submit Waste Management Field Documentation Form to the Waste Management Network.	AECOM	Field Team Lead

Project Team Responsibilities

Task	Organization	Individual
Coordinate sampling activities.	AECOM	Brandt Morrow or the SR
Provide characterization testing bottles and final analyses reports.	AECOM	AECOM ADQM Group
Collect waste characterization samples.	AECOM	Field Team Lead
Review analytical data to determine RCRA classification.	AECOM WM Network	AECOM WMC
Inspect RCRA Hazardous and HAZARDOUS WASTE - PENDING ANALYSIS wastes weekly.	NSRC/AECOM	N/A
Label waste containers for shipment.	AECOM	Brandt Morrow or the SR
Prepare shipping papers (i.e., manifests and LDR forms).	AECOM WM Network /Waste Vendor	Disposal Vendor
Sign manifest/LDRs/Bill of Ladings for Shipment	NSRC/AECOM WM Network	AECOM representative with delegation authority
Notify project team of waste disposal completion of activities.	AECOM WM Network	Brandt Morrow
Prepare/submit related reporting.	Norfolk Southern	Norfolk Southern, AECOM WMC, if requested
Archive and maintain all required documents.	NSRC	Steve Aufdenkampe

3.0 Generator Waste Classification

3.1 Potential Federal and State Waste Codes

3.1.1 Listed RCRA Waste

The potential for listed waste codes was evaluated using generator knowledge of site operational history and any past releases. Based on this review, no RCRA listed hazardous waste codes are applicable to wastes generated from this scope. All wastes removed will be analyzed for RCRA hazardous characteristics.

3.1.2 TSCA Waste

Potential waste streams from this project have been reviewed to determine whether they are regulated by Toxic Substances Control Act (TSCA). Based on currently identified waste streams, there are no waste streams that need to be sampled to determine the applicability of a TSCA waste determination.

3.1.3 Characteristic RCRA Waste

Identified waste streams from this project have been sampled to determine whether they exhibit a RCRA defined characteristic. Based on currently identified waste streams, there are waste streams that have exhibited a RCRA hazardous waste characteristic.

Waste Code	Characteristic	Waste Management Area
D004, D008	Toxic for leachable arsenic or lead	Soil for treatment within the AOC to meet site treatment standards

4.0 Waste Management Procedures

4.1 Project Waste

The following waste streams and correlating storage, classification, and labeling requirements are identified below.

Anticipated Waste Streams					
Waste Stream	Proposed RCRA Classification	Anticipated Waste Characterization Testing	Container Requirements and Estimated Volume	Labeling Requirements	Anticipated Disposal Method
Well Abandonment					
Overdrill soils and PVC well casing	Will be classified the same as surrounding soils for remediation/removal	None	Stockpile within the AOC	None	Combine with like soils for treatment and off-site disposal
Concrete pads	Will be classified the same as surrounding soils for remediation/removal	None	Break into 2' X2' X2' pieces and Stockpile within the AOC	None	Combine with like soils for treatment and off-site disposal
Metal protective well covers	RCRA non-hazardous	None	Place in stockpile with other scrap metal for recovery by contractor	None	Metal recycling by contractor
Removal Actions					
Soil and concrete pre-characterized RCRA non-hazardous removal zones	Previously tested and determined to be RCRA non-Hazardous	One sample per 500 tons for disposal facility approval. TCLP analyses for RCRA toxicity characteristic list: SVOCs, VOCs, and metals	Direct load or stockpile within AOC	None	Directly loaded to trucks or loaded from stockpile to dump trucks for bulk transportation and disposal at a permitted subtitle D landfill
Soil and concrete pre-characterized as RCRA hazardous waste for disposal	RCRA hazardous for lead (D008) and Arsenic (D004)	One post-treatment sample per 400 tons for TCLP of Pb and As	Treatment by subcontractor to stabilize leachable metals. Re-treat as required, Confirm treatment and stockpile	None	Loaded from stockpile to dump trucks for bulk transportation and disposal at a permitted subtitle D landfill
Soil and concrete that was not able to be treated on-site	RCRA hazardous for lead (D008) and Arsenic (D004)	One sample per 500 tons for disposal facility approval. TCLP analyses for RCRA toxicity characteristic list: SVOCs, VOCs, and metals	Segregate from RCRA non-hazardous waste and stockpile within the AOC	Yellow Hazardous Waste Label	Loaded from stockpile to dump trucks or roll-off box(es) for transportation to Chem Waste management in Emelle, AL

Anticipated Waste Streams

Waste Stream	Proposed RCRA Classification	Anticipated Waste Characterization Testing	Container Requirements and Estimated Volume	Labeling Requirements	Anticipated Disposal Method
RCRA Non-Hazardous PPE, PVC casing and plastic debris	RCRA non-hazardous based on generator process knowledge	None	Place in plastic bags and stockpile with RCRA non-hazardous soil	None	Combine with stockpiled soil for disposal at a permitted subtitle D landfill
Decon water	RCRA non-hazardous	NA	Decon equipment over soil stockpiles for absorption so that no free liquids are leaving the pile.	NA	Absorbed onto stockpiled soil for disposal at a permitted subtitle D landfill
Excess stormwater or decon water that cannot be applied to stockpiles because piles are saturated.	RCRA non-hazardous	One sample for liquid waste disposal only: Total RCRA toxicity characteristic list VOCs, SVOCs, and metals, pH,	Place in poly tank for temporary on-site storage.	Green Non-Hazardous Waste Label (poly tank only)	Spread over stockpiles for absorption so that no free liquids are exiting the pile. If required, excess water stored in the poly tank will be delivered to the RCRA non-hazardous landfill for solidification and disposal.
General trash	RCRA non-hazardous	NA	Place in container provided by subcontractor	Green Non-Hazardous Waste Label	Disposal as trash and debris by subcontractor

4.2 Special Wastes

4.2.1 Used Oil/Hydraulic Fluids

All used oil and hydraulic fluids must be collected and deposited in approved containers. The containers must be a 55-gallon steel drum. If necessary, approved containers for used oil and hydraulic fluids will be stored in the satellite waste accumulation area and labeled "USED OIL" and "HYDRAULIC FLUIDS," respectively, including the date containerized. A dip stick or other level indicating device shall be available to ensure that the containers do not overflow.

Once filled, the containers will be moved to a permitted waste accumulation area for disposal. Disposal arrangements will be completed by contacting a NSRC Waste Disposal Consultant. Only used oil or hydraulic fluids may be disposed of in this manner. **PCB CONTAMINATED OILS ARE NOT ALLOWED.**

4.3 Solid Waste

All miscellaneous non-hazardous debris generated during site activities will be managed along with investigation wastes.

5.0 Waste Handling Procedures

5.1 Waste Container Inventory Documentation

At the conclusion of the field event, the following documentation should be forwarded to the AECOM Waste Management Group (as necessary).

- Waste Management Field Documentation Form (see Appendix A).

5.2 Container Labeling Instructions

Example labels for the waste streams are included in Appendix B. Label information will be completed in a permanent marker.

Proper labeling is one of the most important requirements in managing product or waste containers, including drums. Always label drums or containers with the identity of their contents. Labels are not to be removed or defaced. Lost or illegible labels must be replaced. There are special labels or container identification requirements for hazardous waste. These labels are included in Appendix B.

5.3 Waste Container Storage Requirements

Drum lids must be securely closed after filling. Per DOT requirements, lids must fit tightly, and closure bolts must be securely tightened before offering the drum for shipment. Non-leaking drums are to be placed in an upright position on pallets where they are not in direct contact with the ground (including gravel, ballast, and soil). Non-leaking liquid drums are to be located within a spill pan or other containment. Container and drum storage areas should be selected to shelter the containers from direct exposure to sun, weather, and floodwaters. Drum lids are to be kept closed with the ring in place and the bung in place when the drum is not in use.

5.4 Container Storage Time Limits and Inspection Requirements

Waste Type	Generator Status	Storage Time Limit	Inspection Requirement
RCRA Non-Hazardous	Not Applicable	1 Year	Initial inventory and as added
RCRA Hazardous	Small Quantity Generator	180 Days	Inventory and inspect weekly
RCRA Hazardous	Large Quantity Generator	90 Days	Inventory and inspect weekly

The accumulation start date is the date waste was first placed in the storage container (e.g., drum, roll-off box, or tank).

Waste containers may be stored in a designated waste accumulation area until characterization is completed and may remain in this area until shipment. An Accumulation Area Inspection Log for hazardous waste is included in Appendix C.

5.5 Temporary Stockpiles for RCRA Non-Regulated Wastes

All tested RCRA non-regulated waste will be stockpiled in locations where potential impact to underlying materials is minimized. Site personnel may use temporary stockpiles until roll-off box containers are available or material can be direct loaded into

end dump trucks. These stockpiles will be covered to control stormwater runoff from the pile during rainfall events.

The stockpiles will be inspected at the close of each working day to make sure they are covered. The stockpiles will be directly loaded for disposal as soon as practicable after selection of the disposal facility, profiling, and contracting are completed.

5.6 Temporary Stockpiles for RCRA Regulated Wastes

Based on the project scope, some removal activities may require hazardous waste material to be temporarily stockpiled within the AOC boundary. Site personnel may use temporary stockpiles until roll-off box containers are available or material can be direct loaded into end dump trailers. *The stockpiles must be within the AOC boundary, and the piles must be covered and managed to prevent stormwater run-off out of the AOC.* All stockpiles, bottom liners, and covers must be removed from the site within 180 days after excavation.

The regulatory guidance addressing use of stockpiles to consolidate and stage waste within an AOC is found in *Management of Remediation Waste Under RCRA*, OSWER 1891 (EPA, October 1998). This guidance states, "Because an AOC is a land based unit, consolidation and or in-situ treatment of hazardous waste within the AOC does not create a new point of waste generation for the purposes of RCRA." This interpretation allows wastes to be consolidated within an AOC without triggering land disposal restrictions.

6.0 Spills and Spill Reporting Policy

Once waste material is loaded and leaves the designated AOC, it is subject to spill reporting requirements.

The following reporting requirements apply whether the material is at the site, outside of the AOC boundary, or in transit. The field team must **report all spills, regardless of the quantity and type of material, IMMEDIATELY to the Chief Dispatcher**. Failure to immediately report a spill can result in fines and/or criminal penalties to both the company and the individual.

Based on the identified scope, the following substances have been identified that may potentially enact spill reporting.

Chemical Substance	Reportable Quantity (RQ)
Petroleum Products (Motor Oil, Hydraulic Oil)	Any quantity that creates a sheen or threatens waters, including ground waters, of the state requires immediate notification to South Carolina Department of Health and Environmental Conservation (SCDHEC).
Arsenic	1 pound of pure arsenic. At 1% or 10,000 mg/kg arsenic, 100 pounds of D004 would need to be released to exceed the RQ.
Lead	10 pounds pure Lead. At 1% or 10,000 mg/kg lead, 1,000 pounds of D008 would need to be released to exceed the RQ.

Immediate notification to the National Response Center (NRC) is required under federal law for certain incidents and spills; therefore, NS policy is to contact the NRC for all unintentional releases regardless of the quantity involved. The NRC reports are to be made by the NS Control Center in Atlanta as soon as the center receives the information from the Division's Chief Dispatcher. The Control Center must also call the regional office of the EPA for any spills of one or more gallons of insulating fluids believed to contain PCBs. Certain local and state authorities also require immediate notifications as denoted in the divisions' Emergency Action Plan.

In the event that a hazardous chemical spill causes harm to an employee, **call the local 911 system for immediate medical attention**. Next, call the Division Chief Dispatcher as soon as possible.

If it can be done safely, spills should be contained (and liquids or solids recovered) with an absorbent boom, portable pools, buckets and other containers, and absorbent media (e.g., pads, pillows, sand) **only** when the spill is known and the hazards are understood. Protect life first and property second.

6.1 Project Contacts

Should a release occur for any of the substances identified above or any others, it should be appropriately reported to the Norfolk Southern Dispatch and project contacts identified below. Based on media affected and/or amount of substance, agency reporting may be necessary. Agency reporting contacts are listed in Section 6.2.

Name	Location	Telephone
Norfolk Southern Dispatch: Emergency – NS Police Communications Center, 24-hour Non-Emergency – NS Environmental Protection Main Office 8 am to 5 pm, Monday through Friday, excluding holidays	Atlanta, GA	800-453-2540 404-582-4645
Brandt Morrow AECOM Project Manager	Charlotte, NC	Office: 704-716-0745
Steve Aufdenkampe NSRC Project Engineer	Atlanta, GA	Office: 404-582-5185

* **Steve Aufdenkampe** will make the appropriate reporting within the NSRC organization.

6.2 Agency Spill Reporting Requirements and Contacts

If a release exceeds the quantity cited above, the release must be reported to the appropriate federal and/or state agency. **Steve Aufdenkampe** shall notify the following agencies as necessary.

Emergency Response Agency Contacts for Spill Reporting

Name	Telephone
EPA National Response Center	1-800-424-8802
South Carolina State 24-hour Notification Number	1-888-481-0125
Local Emergency Response	911

Appendices

Waste Management Field Documentation Form

The NSRC Site Representative (SR) is to submit this form to the AECOM Waste Management Network Consultant via electronic mail at the completion of the project. The designated Waste Management Consultant(s) for this project are:

WM Name: Betsy Bishop Email: Elizabeth.bishop@aecom.com Phone: 303-216-2558

General Information

Field Event Date(s): _____

NSRC Project No. 60482322 Project Manager: Brandt Morrow

Site Name: Wayne Street Project Name: Wayne Street Removal Action

Site Address: 1000 Wayne Street Columbia, SC 29201

SR: Brandt Morrow Phone: 704-716-0745

Site Environmental Coordinator/Contact: None Phone: _____

Waste Information

1. Does this project need help from your AECOM WM Consultant to dispose of waste from this project?

 X YES (Complete the attached waste inventory sheet)

 NO (Answer questions 2 and 3 below)

2. Who will be responsible for disposal of the waste?

3. How was the waste disposed?

Waste Inventory Sheet

Container Number	Matrix (e.g., Soil, GW)	Container Type (e.g., roll-off, drum)	Percent Full	Label (e.g., Hazardous, Pending)	Accumulation Start Date	Waste Characterization Sample Name (If applicable)

Example Label for Non-Hazardous
Soil and Debris for Landfill

NON- HAZARDOUS

Waste

OPTIONAL INFORMATION

SHIPPER NSRC – Wayne Street

ADDRESS 1001 Wayne Street

CITY, STATE, ZIP Columbia, SC 29201

CONTENTS Soil and Debris

NON-HAZARDOUS WASTE

Example Label for Non-Hazardous
Stormwater

NON- HAZARDOUS Waste

OPTIONAL INFORMATION**SHIPPER** NSRC – Wayne Street**ADDRESS** 1001 Wayne Street**CITY, STATE, ZIP** Columbia, SC 29201**CONTENTS** Stormwater**NON-HAZARDOUS WASTE**

Example Label for Soil and Concrete Going to Emelle

HAZARDOUS WASTE			
FEDERAL AND/OR STATE LAWS PROHIBIT IMPROPER DISPOSAL.			
IF FOUND, CONTACT THE NEAREST POLICE OR PUBLIC SAFETY AUTHORITY, THE U.S. ENVIRONMENTAL PROTECTION AGENCY.			
GENERATOR INFORMATION:			
Name:	Norfolk Southern Railway Company - Wayne Street		
Address:	1001 Wayne Street	Phone:	404-582-5185
City:	Columbia	State:	SC
		ZIP:	29201
EPA ID NO./			
MANIFEST DOCUMENT NO.: SCR000778688			
ACCUMULATION START DATE:	TBD	EPA WASTE NO.:	D004, D008
NA3077, Hazardous Waste, solid, n.o.s. (arsenic, lead), 9, PGIII			
D.O.T PROPER SHIPPING NAME AND UN OR NA NO. WITH PREFIX			
HANDLE WITH CARE!			

90/180-Day – Accumulation Area Inspection Log
(Completed weekly when Hazardous Waste exists in 90/180-Day Storage Pad)

Date: _____ Time: _____

Inspector Name: _____

Requirements	Meets Requirements (Yes or No)	Changes Needed	Date Corrected
Each container (as applicable) labeled with words "Hazardous Waste."			
Each container (as applicable) has "Accumulation Start Date."			
Each container has applicable waste code.			
Container labels legible.			
Containers tightly closed.			
No evidence of rust, dents, etc. on drums.			
No containers leaking.			
Aisle space is open and free of obstructions.			
Storage is less than 180 days (SQG).			
Waste (hazardous and non-hazardous) is segregated properly.			
"No Smoking Sign" is clearly visible.			
Spill kit and materials are present and in good condition.			
No strange smells are noted.			
Communication or warning devices are present and working properly.			

Comments _____

Appendix D
Air Monitoring Plan

Perimeter Dust Monitoring Plan

Wayne Street Site

Columbia, SC

June 6, 2016

Norfolk Southern Railway Company (NSRC) will undertake remediation activities at the Wayne Street Site (the Site) to excavate and dispose surface and subsurface soils impacted by lead (Pb) and arsenic (As) by previous Site use. The site is located at 1001 Wayne Street in Columbia, South Carolina and is about 3 acres in size and triangular in shape. Soil excavation will be performed throughout the entire Site. The work will be performed under the South Carolina Department of Health and Environmental Control (SCDHEC) Voluntary Cleanup Program. The remediation will involve soil excavation, addition of a soil amendment, and disposal at an offsite facility. The construction activities are expected to take from 45-60 days to complete. NSRC will contract directly with a remediation contractor (Contractor) to perform the soil excavation under the direction of AECOM.

AECOM, under contract to NSRC, will perform ambient air monitoring (AAM) during remediation to document Site specific air quality and to provide timely feedback to the onsite construction manager.

SCOPE OF WORK

United States Environmental Protection Agency (USEPA) guidance for AAM has identified certain key elements that are common to any AAM study¹. These key AAM program elements include:

1. Program goals;
2. Target compounds;
3. Sampling period & frequency;
4. Number & location of samplers;
5. Sampling & analysis methods;
6. Network operations;
7. Quality assurance; and
8. Data management & reporting.

Program Goals:

AECOM will monitor air quality at the Site to help protect the health of both site personnel and the adjacent public. The goals of this monitoring effort are to:

1. Guidance for Ambient Air Monitoring at Superfund Sites, EPA-451/R-93-007, May 1993

1. Document air quality downwind of remediation activities throughout the remediation effort; and
2. Provide timely feedback to the Site engineer so that onsite activities can be modified as necessary to maintain downwind concentrations at acceptable levels.

Target Compounds:

The soils at the Site were characterized in 1998. Seventeen samples were collected and analyzed for eight elements of interest. The results were compared with USEPA Risk-Based Concentrations (RBCs) for industrial areas and only lead had any exceedances.

Based on the available information, the primary target compounds of interest in the shallow soils at the Site are lead (Pb) and arsenic (As).

Lead	Arsenic
Maximum = 25,440 ppm Average = 5,875 ppm	Maximum = 130 ppm Average = 39 ppm

Particulate matter (dust) emissions also are a potential concern, given the potential for excavation, truck traffic, and other activities to generate dust emissions.

AECOM will monitor for:

- Respirable particulate matter (PM₁₀); and
- Selected elements [Arsenic (As) and Lead (Pb)].

In addition, meteorological data (i.e., wind direction, wind speed, temperature, and precipitation) will be obtained from the nearest National Weather Service (NWS) site (i.e., Station KCUB at the Columbia airport).

Sampling Period and Frequency:

Remediation work is scheduled to begin during the early parts of 2017 and run for approximately two months (45 – 60 days). AECOM will collect particulate matter data throughout the duration of the intrusive work (e.g. soil excavation and associated management and handling of impacted media) at the Site. Readings will be made with a portable dust meter at least once per hour. In addition, visual observations will be used to guide dust control measures (any visible dust may trigger a response).

AECOM will collect additional PM₁₀ [filter] samples on a regular basis when intrusive activities are scheduled. The samples will be collected over an 8-hour period during normal work hours (e.g., 8:00 am – 4:00 pm) for subsequent offsite elemental analysis. The sample duration can be extended to up to 24 hours if desired. At a minimum, two sets of samples will be collected per week of intrusive activity.

Sampling will be performed for one week prior to the start of excavation activities as a check of the monitoring systems and procedures, and to generate baseline data.

Number and Location of Samplers:

We propose to collect samples at one upwind and one downwind location near the fenceline of the Site, based on the predominant wind directions being from the southwest (SW) and from the northeast (NE) as shown in the figure below. This should provide air quality data both upwind and downwind of the remediation activities. The proposed perimeter air monitoring sites are shown on Figure 1. The final sites will be selected in the field taking into account the predominant wind direction, the local topography, the availability of electrical power, the orientation of any near-by sensitive receptors and any other logistical considerations.

The portable dust monitoring equipment is more mobile and can be moved from day to day to account for the predicted winds for a given day. This monitoring also can be moved closer to the Site activities, to address potential worker exposures.

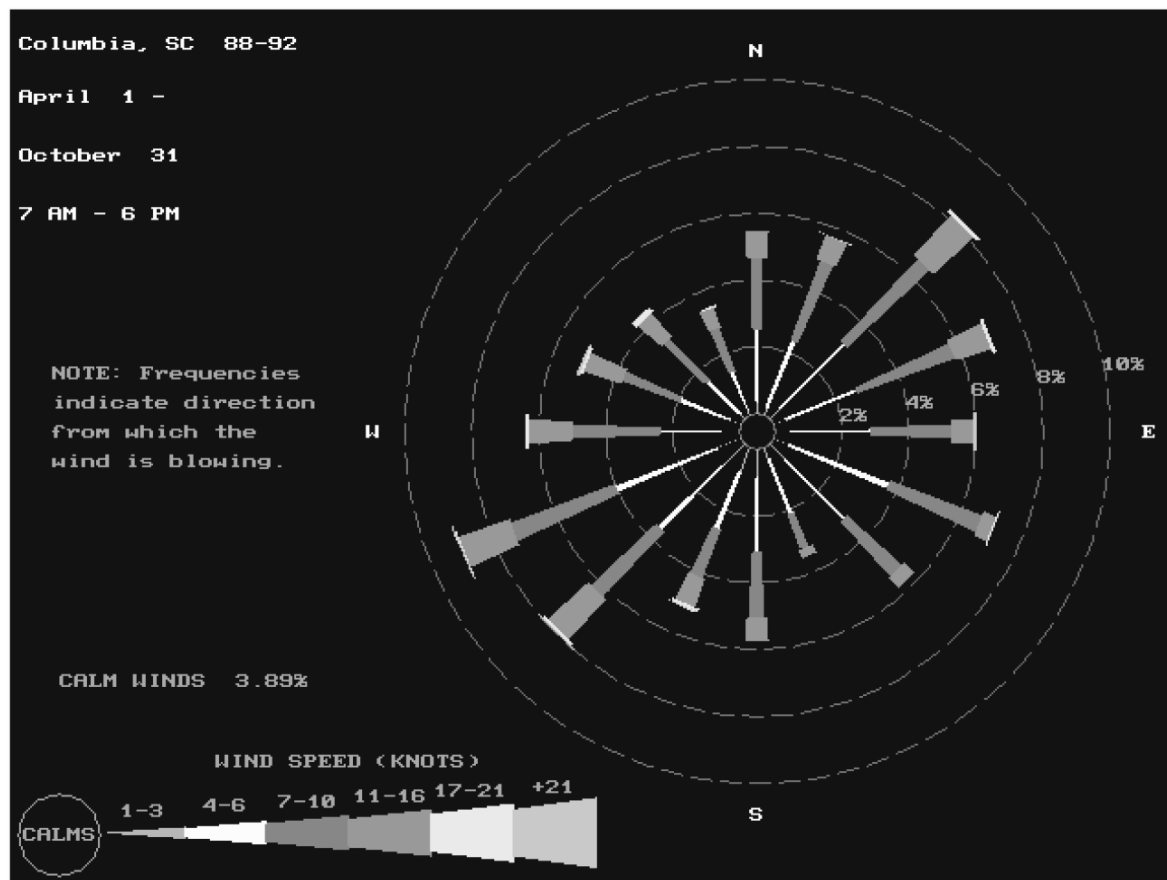


Figure 1. Wind Rose for Columbia, SC
Source: <http://www.epa.gov/ttn/naaqs/ozone/areas/wind.htm>

Sampling and Analysis Methods:

Proposed AAM sampling and analysis methods are summarized in Table 2. The analyses will be performed by Alpha Analytical Laboratories in Westborough, Massachusetts or an equivalent, certified laboratory.

Particulate matter of less than 10 microns in aerodynamic diameter (PM₁₀) will be collected using high-volume samplers with a PM₁₀ inlet and drawing approximately 1 m³/min through a quartz fiber filter. The PM₁₀ mass will be determined by comparing pre- and post-sampling filter weights. A portion of the filter will be dissolved and the extract analyzed for elements of interest using inductively-coupled plasma emission spectroscopy (ICPES).

There will be a significant time lag between sample collection and receipt of data from the offsite analytical laboratory. Therefore, a portable dust monitor also will be available onsite and used to provide real time feedback about air quality at the Site. A MIE Personal DataRAM PDR 1000 or an equivalent device will be used to provide real time data, as needed, at locations of interest near and downwind of the work activities. If downwind dust levels exceed action levels outlined in the Health and Safety Plan or visible dust emissions are observed, water sprays or other measures will be used to reduce dust emissions. If dust emissions are controlled, air emissions of lead, arsenic, etc. will also be controlled.

The concentration of potential concern (CPC) for each constituent of concern is summarized in Table 3. Constituent concentrations below the CPCs are considered acceptable. CPCs are the net ground level (NGL) concentrations obtained by subtracting the upwind concentration from the measured downwind concentration.

Network Operations:

Experienced AAM personnel will perform initial setup and calibration of the equipment onsite. Subsequently, the Site Supervisor will perform or oversee AAM monitoring activities.

Quality Assurance:

The data quality objectives (DQOs) for the project are summarized in Table 4. The DQOs establish criteria for respirable particulate matter (PM₁₀) measurements by high-volume sampling, as well as Pb and As by (ICPES) according to EPA Method SW6010. Meteorological data from the NWS site should readily meet the criteria shown.

Quality control (QC) procedures will be followed to determine data quality on an ongoing basis during the program. QC checks will address the accuracy and precision of the data, as well as the contribution from any background sources. Accuracy will be addressed by ensuring that the sampling equipment is properly calibrated.

Precision will be determined from colocated (duplicate) samples collected at one monitoring site and analyzed offsite for PM₁₀, As, and Pb. Duplicate samples will be collected at a frequency of

20% of the regular samples.

The sampling media and analytical reagents can contribute to the measured values. The contribution from these sources will be determined from laboratory and field blanks. Field blank samples will be collected at a frequency of 20% of the regular samples.

Data Management:

The data reported from the laboratory will be evaluated by AECOM, any outliers identified, and summary statistics provided. All analytical results, will be maintained by AECOM in a computerized database. In general, the goal is to have 90% or more of the attempted monitoring events result in valid data.

Schedule & Reporting:

AECOM will review the data as it becomes available. The typical data turnaround time for the proposed analyses is about three weeks. A data summary will be prepared at the end of the sampling effort and distributed in quarterly reports to SCDHEC as required by the VCC. If necessary, the upwind and downwind monitoring results will be compared to develop the net ground level (NGL) concentration, which is the fraction of the downwind measured concentrations that is due to the remediation activities. The measured values will be compared with the concentrations of potential concern given in Table 3. Supporting information, such as laboratory reports and any field notes, will be included as appropriate.

Table 1. Proposed Monitoring Locations

Site ID	Approximate Location	Monitoring Equipment
SW	Near fenceline. Typical upwind site.	High-volume PM ₁₀
NE	Near fenceline. Typical downwind site.	(2) High-volume PM ₁₀

Site NE = Duplicate (collocated) monitors

Table 2. Summary of Measurement Parameters

Measurement Parameter	Frequency	Sampling Method	Analytical Method
Particulate Matter (PM ₁₀)	Continuous	MIE Personal DataRAM PDR 1000	Opacity-based portable analyzer
Particulate Matter (PM ₁₀)	Weekly ^a	High-volume PM ₁₀	Gravimetric
Elemental Analysis (As, Pb)	Weekly ^a	High-volume PM ₁₀ sampler	EPA Method SW6010

^a – Twice per week that intrusive activities are scheduled at each of two monitoring locations

Table 3. Summary of Project-Specific Concentrations of Potential Concern

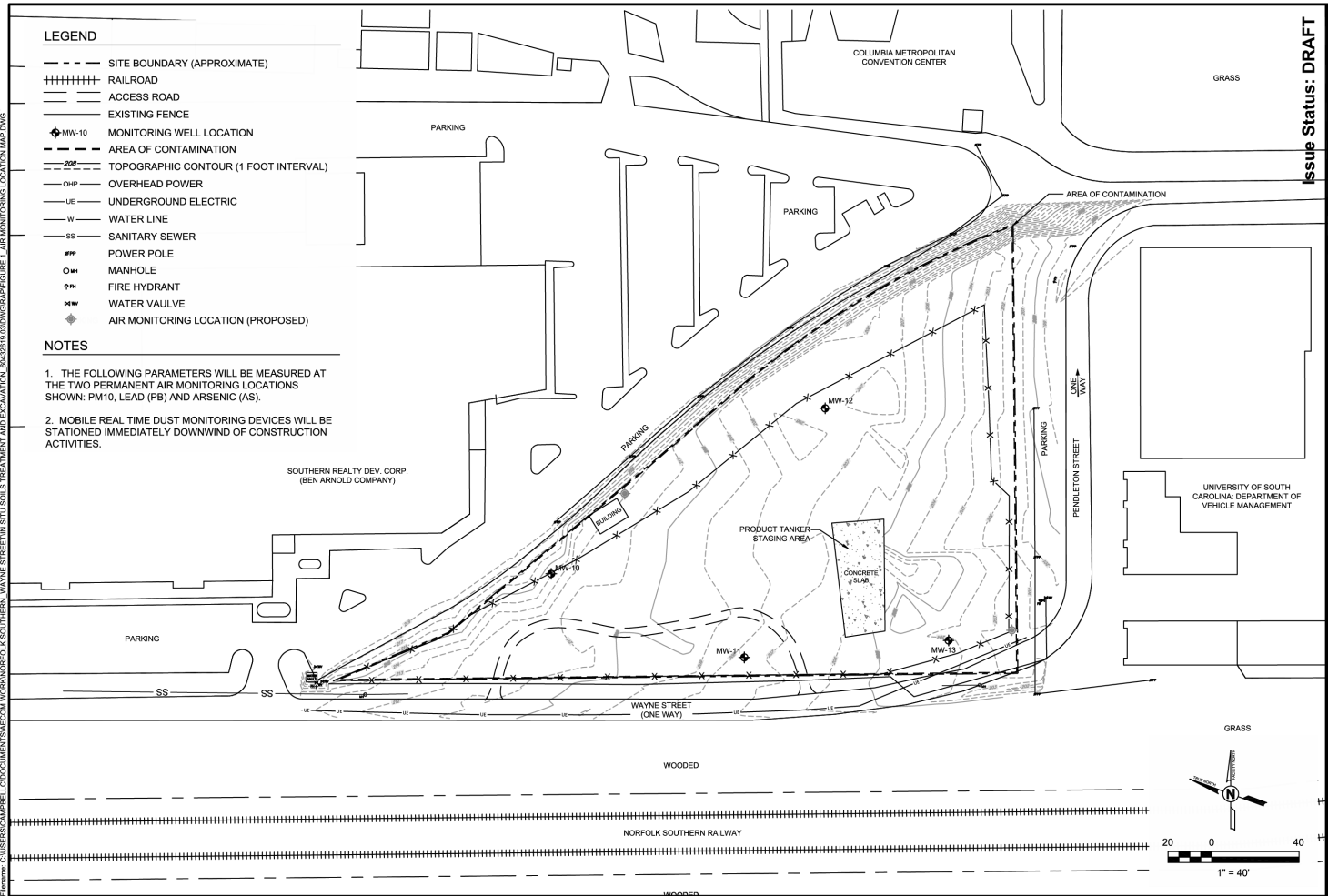
Pollutant	Averaging Period	Concentration	Source / Basis
PM ₁₀	24-Hr	150 µg/m ³	NAAQS
Lead (Pb)	Duration of project	0.15 µg/m ³	NAAQS
Arsenic (As)	Duration of project	0.1 µg/m ³	Project-specific value

NAAQS = National Ambient Air Quality Standards

Table 4. Data Quality Objectives for Measurement Data

1. High-Volume Measurements of PM ₁₀ , Lead, and Arsenic		
PM ₁₀ – High-Volume Method		
Protocol Required Detection Limits	5 µg/m ³	
Sample Collection Completeness	90%	
Blank Level	< 5 mg	
Lead – (Filter from PM ₁₀ High-volume)		
Protocol Required Detection Limits	0.01 µg/m ³	
Recovery (%) at ≥100 µg	70 – 130	
Sample Collection Completeness	90%	
Blank Level	< 0.003 µg/m ³	
Arsenic – (Filter from PM ₁₀ High-volume)		
Protocol Required Detection Limits	0.01 µg/m ³	
Recovery (%) at ≥100 µg	70 – 130	
Sample Collection Completeness	90%	
Blank Level	< 0.003 µg/m ³	
2. Meteorological Data		
Ambient Temperature	Accuracy ± 1.8°F	
Wind Speed	Accuracy ± 0.4 mph	
Wind Speed	Threshold Limit: 0.6 mph	
Wind Direction	Accuracy ± 5 degrees	
Wind Direction	Resolution: 1 degree	
Precipitation	Accuracy ± 0.01 in.	
Completeness	> 90% of 5-minute averages for each event	

ANSI B 11" x 17" Project Management Information: Approved: 03/10/2016 10:02 AM
Project Name: COLUMBIA METROPOLITAN CONVENTION CENTER, 1 AIR MONITORING LOCATION MAP
Project Number: 60482322 Date: 2016-08-02



Issue Status: DRAFT

Appendix E
Tree Survey Memo

Meeting Minutes

Subject	City of Columbia Landscape and Tree Ordinance
Date	02/25/16
Time	1000am
Location	NSRC Wayne Street Site
Attendees	Russell Reynolds, Chuck Suddeth, Scott Holder (city of Columbia)
Prepared	04/26/16
Prepared by	Brandt Morrow
Distribution	Steve Aufdenkampe; Project Central File

Prior to construction activities at the Norfolk Southern Wayne Street Site (the Site), AECOM project professionals, Russell Reynolds and Chuck Suddeth, meet with the City of Columbia Land Development Planner, Scott Holder, to discuss requirements pursuant to the Landscape and Tree Ordinance, sections 17-412 and 17-422.

In lieu of section 17-412, it was determined by visual and physical inspection of the site that a formal tree inventory/survey did not have to be submitted to the city for review as the site did not contain any "grand trees" or trees within protected zones.

In lieu of section 17-422, it was understood that this was a remediation project under the direction of South Carolina Department of Health and Environmental Control (DHEC) and not a construction project, that tree restoration did not need to be completed. This determination was contingent on the fact that the current owner, NSRC, would not redevelop the property. It is also contingent on the fact that the zoning of adjacent properties remains equivalent as to not trigger a buffer transition zone (17-417).

Appendix F

Treatability Study



**Sevenson
Environmental
Services, Inc.**

May 26, 2017

AECOM
1600 Perimeter Park Drive
Suite 400
Morrisville, NC 27560

**Re: Treatability Studies Completed on Lead Impacted Soil,
Norfolk Southern, Wayne Street Site, Columbia, SC**

Sevenson Environmental Services, Inc. recently collected two samples from the above referenced site for evaluation. The goal of the evaluation was to reduce TCLP Lead to less than 5.0 mg/L via chemical treatment, thereby eliminating the D008 characteristic, and to allow for placement as nonhazardous material to an onsite facility.

The samples were collected by Sevenson at the site February 11, 2016 and received the following day at Waste Stream Technology (WST) in Niagara Falls, NY. WST is a licensed treatability lab, and a wholly owned subsidiary of Sevenson.

Once samples are received, they are logged, weighed, and aliquot(s) are removed for characterization analysis. After characterization, additional aliquots are removed, and treatment mixes are prepared based upon an analysis of the characterization results.

Initial Characterization

Sevenson received two samples labeled as Near Well 10 (C-1 0-1') and Near Well 11 (E-1 0-1'), assigned WST ID Number 6B15018-01 and 6B15018-02 respectively. The samples were characterized as follows:

TABLE I

AECOM Norfolk Southern, Wayne Street Site Initial Characterization				
Constituent	Total Metals (mg/kg)		TCLP (mg/l)	
	C-1 0-1'	E-1 0-1'	C-1 0-1'	E-1 0-1'
Sample ID	6B15018-01	6B15018-02	6B15018-01	6B15018-02
Arsenic	<40	<175	<0.050	<0.050
Lead	5,520	64,200	8.84	639

Total Metals (SW-846 Method 6010) Leach Test - TCLP (SW - 846, Methods 1311 and 6010)

The results of characterization indicate that the subject material would be considered characteristically hazardous for lead (D008) upon excavation without treatment.

8270 Whitcomb Street, Merrillville, Indiana 46410 • (219) 756-4686

An Equal Opportunity Employer



Treated Results

Once the samples were characterized additional aliquots were removed from the container and were treated using Severson's MAECTITE process. The samples were mixed and began tumbling for the TCLP procedure on the same day. The TCLP Lead results after treatment are listed in Table II.

TABLE II

AECOM Norfolk Southern, Wayne Street Site Treated Results			
	TCLP (mg/l)		
	C-1 0-1'	C-1 0-1'	C-1 0-1'
Sample ID	6B18001-01	6B18001-02	6B18001-03
Dose Rate %	0.5	0.75	1.0
Arsenic	<0.050	<0.050	<0.050
Lead	1.86	1.20	1.15
	E-1 0-1'	E-1 0-1'	E-1 0-1'
Sample ID	6B23017-02	6B24012-02	6B25001-01
Dose Rate %	4.0	5.0	6.0
Arsenic	<0.050	<0.050	0.050
Lead	17.3	5.18	2.32

Leach Test - TCLP (SW - 846, Methods 1311 and 6010)

All three dose rates for the sample from the area near MW-10 (C-1 0-1') were effective in achieving the treatment objective of <5.0 mg/L TCLP lead. The treatment objective of < 5.0 mg/l was achieved with the 6% dose rate of MAECTITE Reagent for the sample from the area near MW-11 (E-1 0-1').

We appreciate this opportunity to be of service. Should you have any questions, please contact me at (219) 756-4686.

Sincerely,
Severson Environmental Services, Inc.

Chris Rice
Project Manager